ROLE OF PROPHYLACTIC ANTIBIOTIC TO PREVENT SURGICAL SITE INFECTIONS IN CLEAN SURGERIES

DISSERTATION SUBMITTED FOR

BRANCH - I M.S (GENERAL SURGERY)

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CHENNAI

CERTIFICATE

This is to certify that the dissertation entitled **ROLE OF PROPHYLACTIC ANTIBIOTIC TO PREVENT SURGICAL SITE INFECTIONS IN CLEAN SURGERIES** is the bonafide work of **Dr. J. SULTHANA DHILRAS** in partial fulfillment of the university regulations of the Tamil Nadu Dr. M.G.R. Medical University, Chennai, for M.S (Branch I) General Surgery examination to be held in April 2013.

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DECLARATION

I, **Dr.J. Sulthana Dhilras.,** hereby declare that, I carried out this work on "**ROLE OF PROPHYLACTIC ANTIBIOTIC TO PREVENT SURGICAL SITE INFECTIONS IN CLEAN SURGERIES"** at the department of surgery, Govt. Rajaji Hospital, Madurai,under the guidance of Prof.Dr.S. Selvachidambaram,M.S., PROFESSOR OF SURGERY, during the period of June 2011 to June 2012. I also declare that this bonafide work has not been submitted in part or full by me or any others for any award, degree or diploma to any other university or board either in India or abroad.

This is submitted to the Tamilnadu DR. M.G.R. Medical University, Chennai in partial fulfilment of the rules and regulations for the M.S degree examination in general surgery (Branch I) to be held in April 2013.

Place:

Date: (Dr. J.SULTHANA DHILRAS)

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CONTENTS

"Our arsenals for fighting the bacteria are so powerful that we are in more danger from them than from the invader"

-- Lewis Thomas

INTRODUCTION

Surgical site infections are one of the most common hospital acquired infections, which constitute 38% of surgical infections. It creates great burden to the patients by increasing hospital stay by 7-10 days. Also, it increases hospital expenditures creating an economic burden to the patient and country.

Basis of antimicrobial prophylaxis

The basis of prophylaxis is to obtain appropriate levels of the drugs in serum and tissues that exceed the Minimum Inhibitory Concentrations (MIC) for the likely micro organisms causing a specific surgical infection.

It is considered optimal if the antibiotic is administered 30 minutes before putting a skin incision or at the time of induction of anaesthesia. Usually single dosage of antimicrobial agent is optimal for a surgical procedure unless it prolongs for more than three hours.

It is not advisable to use the antibiotics for a prolonged period due to multidrug resistant strains emergence.

Undue fear in surgeons minds?

Surgical-site infection (SSI) rate in clean surgeries and clean contaminated surgeries are 2% to 5% and upto 20% respectively. Usually prophylaxis is not used for clean surgeries. But prevalent usage of prophylactic antibiotics in these clean procedures is due to the undue fear of infection in the minds of majority of our surgeons. Appropriate usage of antibiotics gains paramount importance due to emergence of multi drug resistant strains.

AIMS AND OBJECTIVES

The objective of the study was to evaluate the role of prophylactic antibiotics to prevent surgical site infections in clean and elective surgeries.

Surgeries included in the study were:

- Hernia repair
  - Open hernioplasty
  - Laparoscopic hernioplasty
- Neck
  - Thyroid surgeries
  - Lipoma nape of neck
- Breast
  - Modified radical mastectomy
  - Excision biopsy
- Scrotal surgeries
  - Hydrocele
  - Epididymal cyst excision

PROPHYLACTIC ANTIBIOTIC VS NO ANTIBIOTICS:

To compare the surgical site infection in two groups of patients,

- one receiving prophylactic antibiotics (Study group) and
- the other group without any prophylaxis before surgery. (Control group)

REVIEW OF LITERATURE

Historical background:

As surgeons, though we deal with infections since the dawn of time, our understanding to treat wound infection became clear only after the development of theory of antisepsis and the evolution of germ theory. Many observations made by nineteenth century physicians were crucial in our knowledge regarding the pathophysiology, treatment and prevention of surgical site infections.

Louis Pasteur formulated germ theory and elucidated that contagious diseases are caused by specific microbes. With the help of these principles, he pioneered techniques of sterilization. Also, he identified certain organisms responsible for human infections like *Staphylococcus*, *Streptococcus*, and pneumococcus.

Joseph lister used a solution of carbolic acid, which were used to treat sewage in his times in Europe, to dress the patients. As this reduced the post operative infection incredibly, it was quickly adopted throughout his country.

In 1880, Robert Koch, through his experiments identified pathogenic organisms associated with specific disease like cholera and tuberculosis.

Charles Mc Burney pioneered the principle of source control (i.e, surgical intervention to eliminate the source and thereby treat the infection) by performing appendicectomy as treatment of appendicitis, which was previously known to be a fatal disease. This was popularised after been performed on the King Edward VII of England, by Sir Frederick Treves.

The discovery of effective antimicrobials helped the modern surgeons to treat wound infections in a much better way, during the twentieth century. During world war I, Sir Alexander Fleming, an army medical officer in British Medical Corps identified the first antibacterial agent Penicillin through his works on the natural action of blood against bacteria and sepsis. During his study on influenza virus, in 1928, he noticed a zone of inhibition around *Penicillium notatum* colony that grew profusely on a plate of *Staphylococcus*. He then named the substance derived as '*penicillin'*.

This subsequently led to the development of hundreds of potent antimicrobial agents against infectious organisms, which set an example for their use as *prophylaxis against postoperative wound infection*, and became a very crucial component in the treatment of aggressive and potentially fatal surgical wound infections.

Prolific advances in the field of clinical microbiology paved way for the discovery of many new anti microbial agents against those microbes. Also the discovery of autochthonous microflora of skin, respiratory tract, alimentary tract helped modern surgeons to enhance their knowledge about the organisms which will be encountered during surgery. However, whether these organisms were pathogenic or non pathogenic remained unclear.

With clinical observations made by veteran surgeons, Frank Meleny and William Altemier, the fact that aerobes and anaerobes synergise to cause serious infections (soft tissue infections and intraabdominal sepsis) came into limelight. So the concept that inhabitant microorganisms were not pathogenic to human body was vanished as these organisms have the potential to cause surgical infections when entered into sterile cavity during the time of surgery. Over the few last decades, new ideas of polymicrobial nature of surgical infections were propagated. Aspirates from the peritoneal fluid of patients with perforated viscus or gangrenous appendicitis also showed the presence of aerobes and anaerobes. Trials were conducted to know the effective source control to treat these infections and antimicrobial agents were administered targetting both pathogens and commensals.

William osler, one of the pioneers of American Medicine, from his observations noted that patient died due to inflammatory response in the body to a organism. This allowed our insight into the host inflammatory response to infection. It is because of activation of multiple pathways in response to an infection. So many new therapies were formulated tagetting the modified inflammatory response. Exaggerated inflammatory response seems to be the cause of end organ failure and multi organ dysfunction. Thus, treating surgical infections and thereby preventing multi organ failure is one of the challenges faced by surgeons like us.

PATHOGENESIS OF INFECTION:

Host defences:

- Barrier
- Microbial flora
- Humoral responses
- Cellular responses
- Cytokine production

Defense barriers:

- Physical barriers

- Chemical barriers
- Immunologic barriers

Mammalian host possesses intrinsic defense mechanisms that help to prevent invasion of microbes, multiplication of organisms and thereby cause containment of infection. Our host defences are highly regulated system and are very effective in coping the invaders. They include:-

1. Site specific defences (SSD)
2. Systemic defenses

Site specific defenses provide protection at tissue level.

Systemic defences begin immediately after invasion of pathogen into sterile area of body.

Any micro organism will have to face number of barriers in the body.

1. Epithelial barrier
2. Mucosal barrier.

Mucosal barriers provided by mucosa of respiratory, gastrointestinal and urogenital system.

Host barrier cells prevent invasion of microbes and proliferation by secreting certain substances. Skin commensals adherent to surface preclude virulent organism invasion, thereby forming colonisation resistance.

PHYSICAL BARRIERS:

Skin:

Skin, the largest organ in the body provides most extensive physical barrier. Resident or commensal microflora on the surface of skin block the attachment of pathogens. Some of the endogenous microflora include staphylococcus, streptococcus, corynebacterium, propionibacterium species. Also, Enterococcus faecalis, Enterococcus faecium, Escherichiae coli, Enterobacteriacae and Candida albicans are isolated from skin surface below the umbilicus. Skin diseases can be associated with abnormal proliferation of skin commensals.

Respiratory tract:

Host defences in respiratory tract help to maintain sterile environment in distal bronchi and alveoli under normal circumstances. Larger particles are trapped in the mucosa of respiratory tract which are later cleared through cough. Smaller particles reaching the lower

respiratory tract are cleared by pulmonary macrophages through phagocytosis. Any breach in this process leads to bronchitis or pneumonia.

Gastrointestinal tract:

Numerous microbes are encountered in many portions of gastro intestinal tract. Places where resident microflora are absent include urogenital, biliary and pancreatic ductal system under normal circumstances. However, in case of inflammation, malignancy, stone formation or catheterisation, microorganisms may proliferate.

Vast number of micro organisms are found in oropharynx and colorectal region. But, organisms found in entire gastro intestinal tract are not always from oropharynx. It is because of the following reasons:

1. Highly acidic environment in stomach kills the microbes.
2. Low motility in stomach during initial phases of digestion.

Thus, microbial population in stomach accounts to approximately 10^2 to 10^3 colony forming units (CFU). But this may be increased during disease states or drug intake.

In terminal ileum, microbial proliferation occurs, increasing count to approximately 10^5 to 10^8 CFUs. Exponential growth occurs in colon due to its relatively static and hypoxic environment, where aerobic species are outnumbered by anaerobic organisms to approximately 10: 1.

FIGURE 1 MICROFLORA IN GASTROINTESTINAL TRACT

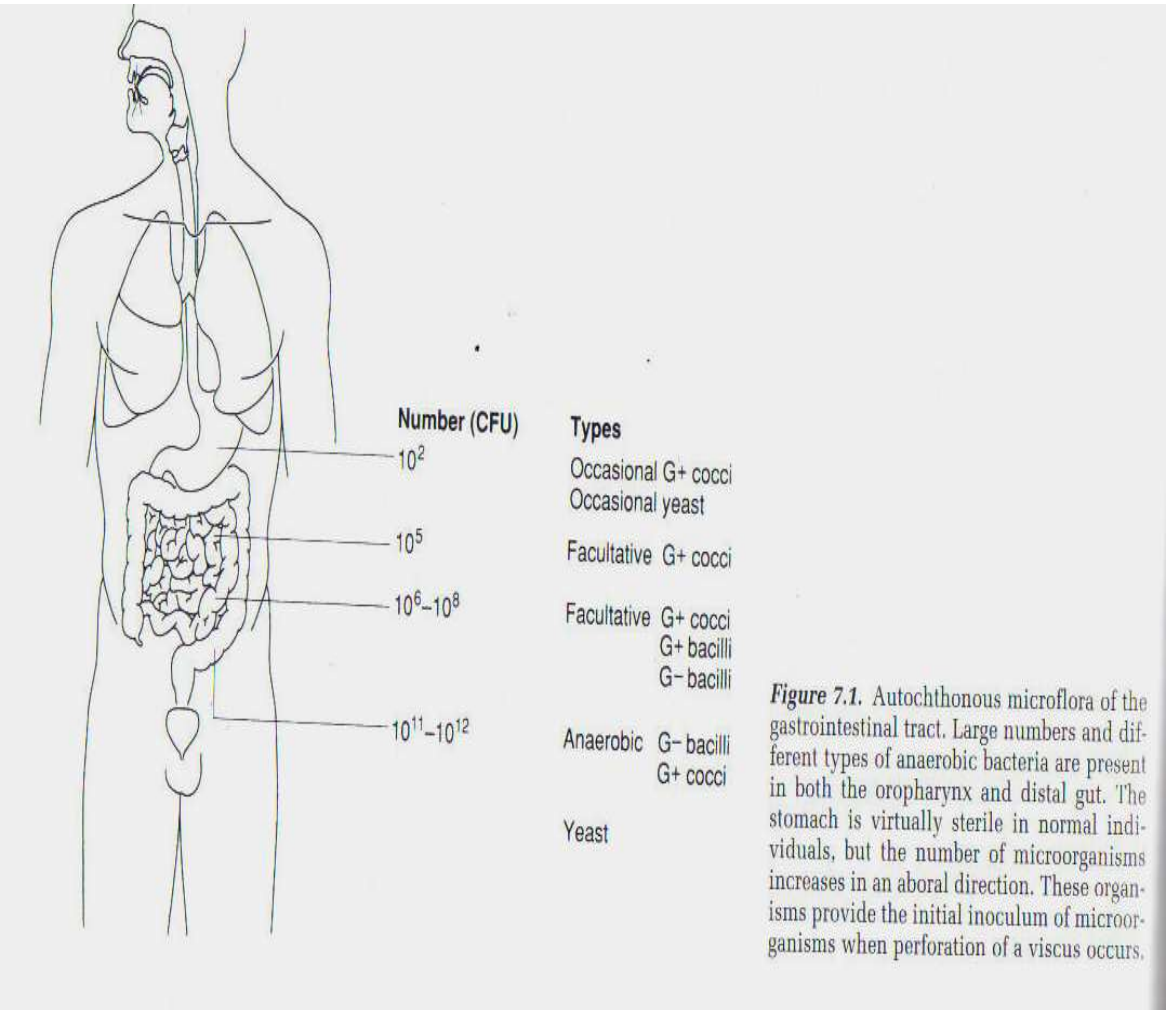


Figure 7.1. Autochthonous microflora of the gastrointestinal tract. Large numbers and different types of anaerobic bacteria are present in both the oropharynx and distal gut. The stomach is virtually sterile in normal individuals, but the number of microorganisms increases in an aboral direction. These organisms provide the initial inoculum of microorganisms when perforation of a viscus occurs.

Part of GIT	Microbial population(CFU/ ML)
Stomach	10^2 to 10^3
Small intestine	10^5 to 10^8
Distal colorectum	10^{11} to 10^{12}

Along with facultative and obligate anaerobes like Bacteroides, Lactobacillus, Clostridium, Fusobacterium and Eubacterium, some aerobic microbes like Escherichia coli, Enterococcus faecalis, Enterococcus faecium, Enterobacteriacae and Candida albicans are also present in the colon. These organisms provide colonisation resistance and prevent the entry of other organisms like Vibrio cholera, Shigella, Salmonella. But when pathology like perforation occur, the commensal organism provide nidus of infection for the pathogens to proliferate. Surprisingly very little host organisms contribute to the intra abdominal infection.

When pathogens enter specific body compartments or tissue, defense mechanisms act to eliminate or remove the nidus of infection. Apart from providing physical barrier, certain proteins like

1. Lactoferrin and Transferrin sequester microbial growth factor iron.
2. Fibrinogen in inflammatory fluid trap micro organisms and polymerises to fibrin.

3. Diaphragmatic pumping mechanism on the undersurface of diaphragm help in expunging micro organisms from peritoneal fluid.
4. Omentum, ‘the policeman of abdomen’ serves to limit infection.

Immunologic barriers:-

Defense mechanisms in tissues of the body ;-

a) Resident macrophages regulate cellular host defense.
b) Secretion of cytokines is upregulated by substances like TNF – alpha, IL- 1 beta and INF Gamma.

When microbes interact with defense mechanisms in body, opsonisation occurs. Extracellular destruction of organisms occur by formation of membrane attack complex and intracellular destruction by formation of phagocytic vacuoles.

Complement pathways, both alternate and classical pathways get activated after microbial invasion. Release of complement fragment (C3a, C4a, C5a) increases vascular permeability. When microbial insult occurs, chemotaxis (i.e., attraction of neutrophils to the micro organisms to the site of insult) occurs. This further leads to the influx of

inflammatory fluid to the area of insult. Diapedesis of neutrophils occur within minutes and it peaks within a period of hours or days.

Response to an infection depends upon several factors:

1) Number of micro organisms entering the body.
2) Proliferation of organisms
3) Virulence of organisms
4) Potency of defense mechanism

Invasion of microbes can lead to one of the following possible outcomes.

a) Eradication of infection
b) Limitation of infection (purulent infection is the hall mark of chronic infection)
c) Locoregional infection (cellulitis, soft tissue infection)
d) Systemic infection (bacteremia)

Infection is defined as an 'identification of microorganisms in host tissue or bloodstream, plus an inflammatory response to their presence'. The inflammatory signs of 'rubor, tumor, calor, and dolor' are common, at the site of infection. Apart from these local manifestations, certain systemic manifestations like increased pulse rate and respiratory rate,

elevated temperature and elevated white blood cell (WBC) count. Above noted systemic manifestations comprise the '*systemic inflammatory response syndrome* '(SIRS).

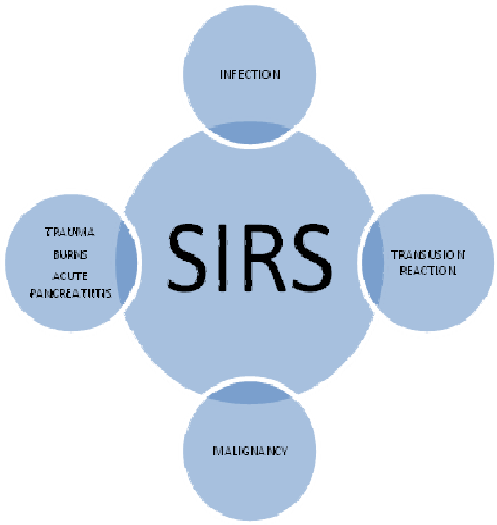


Fig 2. Causes of SIRS

"Sepsis is not an antibiotic deficiency syndrome"

SIRS when it is caused by microbial infection is termed as *sepsis* and it is mediated by production of a cascade of numerous proinflammatory mediators produced in response to the products of microbial invasion. These products can be a lipopolysaccharide (endotoxin) derived from gram-negative bacteria; or a peptidoglycan and teichoic acid from gram-positive bacteria; multiple fungal cell wall components such as mannan and numerous others. Patients have sepsis

if they meet the following clinical criteria for SIRS and have an evident local or systemic infection.

Severe sepsis is defined as sepsis along with the occurence of new-onset failure of organs. It is the frequent cause of death in surgical intensive care units, with a very high mortality rate. i.e., when a patient with sepsis needs ventilatory support and is unresponsive to fluid resuscitation or one who requires vasopressors to correct hypotension, is considered to have severe sepsis.

Septic shock is a state in which patient has acute circulatory failure which is usually identified by the occurence of persistent hypotension (systolic blood pressure <90 mmHg) inspite of aggressive fluid resuscitation, with no other identifiable causes. It is the severe manifestation of infection. It can occur in approximately 40% of patients with severe sepsis; with a very high mortality rate.

PATHOGENS OF INTEREST FOR SURGEONS:

1. BACTERIA

These are little organisms which are of great importance for the surgeons, as they form the vast majority of surgical site infections.

Cell wall staining:

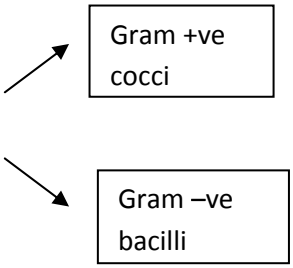
- There are a number of species of bacteria which are identified by a specific staining called Gram's stain.
- This staining imparts specific colour to bacterial cell wall through which it is classified as gram positive and gram negative.
    a) When they stain blue, they are termed as gram-positive bacteria.
    b) And when a bacteria stains red, it is termed as gram-negative.

Growth characteristics:

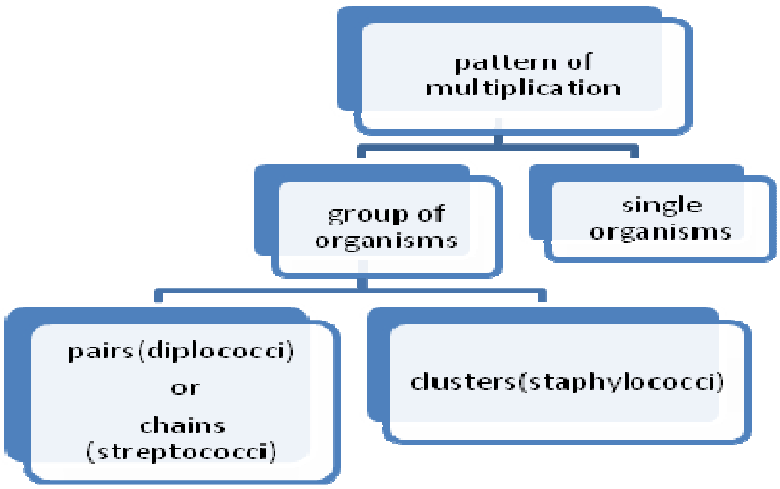
- Every bacteria have certain specific growth characteristics in its specific media.
- Based on a number of some characteristics, bacteria can be further classified.

It can be depending on

a) Morphological characteristics



b) the pattern of multiplication [e.g., single or multiplication in groups of organisms, i.e., in pairs (diplococci) or in clusters (staphylococci), or in chains of organisms. (streptococci).



c) and the presence of spores and its location.

- Terminal spores
- Subterminal spores

Gram-positive bacteria

The bacteria that cause surgical site infections are:

a) skin commensals

- *Staphylococcus aureus* and
- *Staphylococcus epidermidis* and
- *Streptococcus pyogenes* and

These organisms cause infections either alone or in combination with other pathogenic organisms.

b) *commensals of GIT* such as

Enterococci faecalis and

Enterococci faecium.

They have the capability to cause nosocomial infections like respiratory infections, catheter associated infections urinary tract infections (UTIs) and septicaemias in immunologically compromised or chronically debilitated patients. But in healthy individuals, these are of little importance.

Gram-negative bacteria:

The organisms which a surgeon specially interested among gram negative species include:

- *E. coli,*
- *Proteus vulgaris and mirabilis*
- *Klebsiella pneumoniae*
- *Serratia marcescens*
- *Pseudomonas aeruginosa, P. fluorescens.*
- *Enterobacter*

Anaerobic organisms

- These organisms are not able to multiply or divide in the presence of atmospheric air.
- This is because of the absence of the enzyme catalase, which is important for the metabolism of reactive oxygen species.
- They are the predominantly available in many areas of the human body, including oropharynx and colorectum among which flora in oropharynx is different from the one in colorectum.

- *C. Perfringens*
- *C.difficile*
- *C. tetani*
- *C. Septicum or novyi.*
- *Bacteroides fragilis*
- *Propionibacterium*
- *Fusobacterium* spp.

Other bacteria of interest to surgeons include:

- *Mycobacterium tuberculosis*
- *M. avium-intracellulare* and *M. Leprae.*
- *Nocardia*

- These are acid fast and are very slow growing bacilli.
- They are not easily cultivated in laboratory and need specific culture media to grow which may take several weeks to months.
- They are notorious in causing severe pulmonary and extra pulmonary infections which is still prevalent in our country.

Viruses:

- Though small in their size, they cause wide variety of infections, especially in immunocompromised patients.

- Mostly these organisms are intracellular.
- They are extremely difficult to cultivate in artificial culture media.
- They are usually identified by the presence of DNA and RNA using specific techniques in polymerase chain reactions.

Viruses of specific importance for surgeons include:

- *Hepatitis viruses B and C*
- *Ebstein barr virus*
- *Cytomegalovirus*
- *Herpes simplex virus*
- *Herpes zoster virus*.

Fungi

- Fungi cause a number of nosocomial infections.
- They are identified by special staining methods.
- This can be
  - potassium hydroxide
  - Giemsa
  - India ink
  - methenamine silver

- These can be present in yeast form, budding forms or can be observed with numerous branching along with septations.
- They can cause surgical site infections combined with bacteria.
- They cause severe infections in immunocompromised patients.
- Fungi of interest to surgeons include:

  - *C. albicans*
  - *Mucor*
  - *Rhizopus*
  - *Absidia* spp
  - *Cryptococcus neoformans*
  - *Aspergillus fumigates* and A. *niger*,
  - *Coccidioides immitis*.

SURGICAL SITE INFECTIONS

NOMENCLATURE

- DEFINITIONS:

Earlier, the term, 'Surgical Wound Infection Task Force' (SWITF) was used to ascribe surgical site infections.

The term 'SURGICAL WOUND'–was replaced by 'SURGICAL SITE INFECTION'. This term was formulated by CDC in 1992.

Figure-3 Classification of surgical site infection

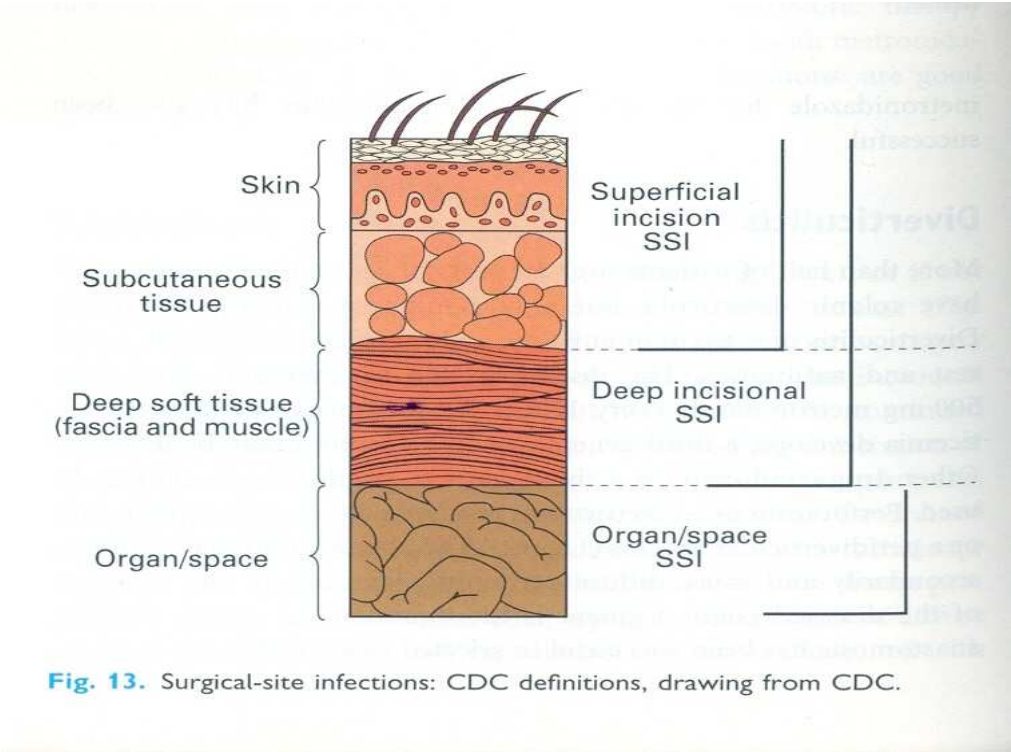


Fig. 13. Surgical-site infections: CDC definitions, drawing from CDC.

Figure-4 Superficial SSI

CATEGORIES OF SSI

SSI were categorized into two,

1. Incisional SSI
    - » Superficial
    - » Deep
2. Organ/space SSI.

Of surgical infections, 60 to 80% are incisional and the remainder are organ/space infections.

SUPERFICIAL SSI

A superficial SSI can be defined as ‘An Infection occuring within 30 days of surgery and it involves only the skin and subcutaneous tissue of incision’.

It includes:

- Purulent aspirate from the site of incision associated with or without positive culture
- Local signs of infection and inflammation – pain, tenderness, localised swelling, redness, heat and this is usually followed by

FIGURE 5 DEEP INCISIONAL SSI

FIGURE 6 DEEP INCISIONAL SSI

- deliberate opening of the superficial incision by surgeon, unless the results of culture reports are negative.
- Micro organisms obtained from the culture of fluid or tissue taken aseptically from a superficial incision
- Diagnosis of superficial infection made by the surgeon

Conditions which should not be considered as SSI include:

1. Stitch abscess
2. Episiotomy wound
3. Infection at the site of circumcision in a new born child.
4. Infected burn wound

DEEP INCISIONAL SSI

Deep incisional SSI can be defined as 'An Infection that is occurring within 30 days of surgery (1yr if an implant is in place) and infection involving deep soft tissues.

It usually includes:

- Purulent discharge from the site of deep incision.
- Fever of 38 degree celsius or More.

- Local pain / tenderness at the incision site and incision dehisces spontaneously or is opened deliberately.
- Abscess or other evidence of infection which involves the deep incision and found on direct examination / visual / radiological / histological examination.
- Diagnosis made by the physician / surgeon.

ORGAN / SPACE SSI

An organ or space SSI can be defined as ‘An Infection occuring within 30 days (1yr of implant) or Infection involving any other part of the anatomy other than that of the incision site which was opened / manipulated at the time of surgery.

It may include :

- Purulent aspirate from the organ / space operated which is identified by a drain
- Micro organisms from the culture obtained aseptically
- Infection identified during reoperation / Histological examination/ imaging.

- **ORGAN SPACE SSI MASQUERADING INCISIONAL SSI**

The following organ space surgical site infection pretends to be an incisional SSI.

- Imaging studies done to rule out subfascial collection / fistula from hollow organs.
- Presumptive usage of systemic antibiotics.
- Interventional radiology/ re-operation done.
- Trigger the lethal MOF(multi organ failure).

FIGURE 7 DEEP/ORGAN SPACE SSI

CLASSIFICATION OF SURGICAL WOUND INFECTION:

CLASS – I : Clean wound

(Expected wound infection rate is 1-3%)

Definition:-

- Atraumatic wound
- There are no signs of inflammation
- Gastrointestinal, Respiratory, Genito Urinary, Biliary tracts are not entered.

Organisms :-- Staphylococcus aureus, Staphylococcus epidermidis

Example:-- Hernia repair, Breast surgeries, Thyroid surgeries.

CLASS – II :–

Clean contaminated

(5-10% expected infection rate)

Definition :-

Elective operation of GIT, Genito Urinary, respiratory tract have been entered during surgery under controlled conditions

Organism:-- Endogenous micro flora of the organ that has been entered

Example:-- Cholecystectomy, Elective bowel resection

CLASS – III:

CONTAMINATED WOUNDS

(Expected infection rate is 15%)

Definition :--

traumatic wounds(fresh)

any breach in the sterile

technique used

Gross spillage from Gastrointestinal tract

Acute non purulent inflammation

Organism :-- Endogenous bacteria

Example :- Appendicectomy

CLASS - IV

DIRTY WOUND

(Expected infection rate is 40%)

Definition :--

Old traumatic wounds

Devitalized tissue

Gross purulence

Pre existing infection

Perforated viscera

Example :-- Hartmann's operation for perforated diverticulitis

RISK FACTORS:

- Rate of SSI is dependent on several variables like

1. Patient
2. Type of surgery
3. Perioperative environment
4. Type of pathogen

$$\text{RISK of SSI} = \frac{\text{dose of contamination} \times \text{virulence}}{\text{host resistance}}$$

CDC SENIC (Study of effect of nosocomial infection control) describes about the predictive index for a surgical site infection.

The following four factors are being considered:--

1) An Abdominal operation

2) An operation that lasts longer than 2 hrs

3) An operation that is contaminated

4) A patient who will have three or more diagnosis at the time of discharge exclusive of wound infection

The patients are given a score of 0 or 1 for the above said variables.

SENIC SCORE

Score	% of infection
0	1%
1	3 – 6%
2	9%
3	17%
4	27%

NNIS risk index

(National Nosocomial Infection Surveillance)

NNIS framed the following variables for risk index in surgical site infection.

- ASA score – 3 or more
- Length of operation – 75^{th} percentile of its duration to a particular surgery
- Level of contamination – contaminated/ dirty

The risk factors associated with surgical site infection can be:

I. ENDOGENOUS FACTORS

II. EXOGENOUS FACTORS

Endogenous(patient related) factors:

This includes:

1. Duration of pre operative stay of a patient in the hospital
2. Presence of any previous infection in patient (I A)
3. History of previous Abdominal operation
4. Age of the patient >50 years or < 1 yr

5. An Obese patient

6. History of Diabetes Mellitus in patient (I B)

7. Immunocompromised state or Malnutrition

8. Altered immune response

9. Usage of Tobacco – (I B)

Exogenous (Perioperative factors):

The exogenous risk factors which also contribute to surgical site infection include the following:

- Prophylactic Antibiotic given to the patient before a surgery or procedure.
- Period or length of surgery – if the duration exceeds more than 3hours, additional dose of antibiotic must be given
- Ventilation of an operating room
- Technique handled by the operating surgeons – usage of cautery cautery, obtaining perfect haemostasis, trauma (IB)
- Asepsis and Proper sterilization of instruments

- Length and duration of surgical scrub using betadine or alcohol (2-5mts)
- Antisepsis of skin (I B) Though removal of hair is controversial in causing SSI, it may contribute to SSI (IA)
- Presence of a foreign material in the surgical site
- showering of a patient before surgery(I B)
- Usage of Surgical drains(guidelines)

SURGICAL WOUND SITE SURVEILLANCE:

Surveillance of wound site is usually done by

a) sterile dressing for 24-48hrs after surgery (IB)

b) washing hands before and after changing dressing (IB)

c) usage of sterile technique for dressing (II)

MEASURES TO PREVENT SSI:

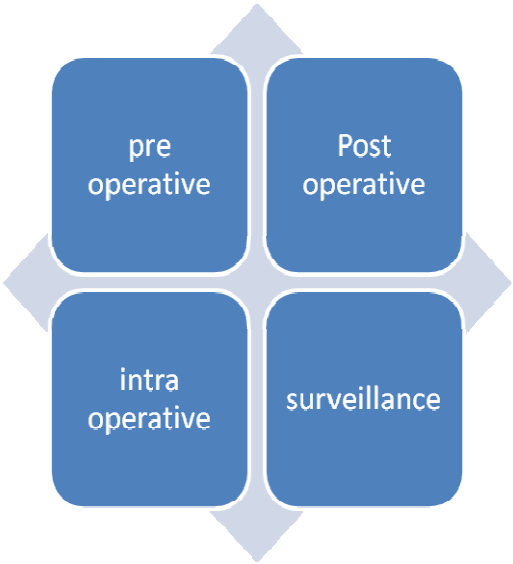


FIGURE 8 MEASURES TO PREVENT SSI

Pre-operative measures

FIGURE 9 PRE OPERATIVE MEASURES

PREPARATION OF PATIENT :

Before preparing the patient for an elective operation, the following steps must be undertaken.

- Identify and treat infections away from the surgical site before operation.
- Keep the pre-operative stay as short as possible
- Proper control of blood glucose levels
- Ask the patient to take a bath before the surgery.
- Do not remove hair unless it interferes with operation and if required, remove with electric clippers immediately before operation.
- Abstain From any forms of tobacco or alcohol consumption prior to operation
- Apply antiseptic agent in concentric circles moving towards periphery.

PREPARATION OF THE OPERATING TEAM

1. Nails should be kept clean and short
2. Surgeon should not wear any rings or hand jewellery

3. Preoperative surgical scrub for 5 minutes

4. Scrub the hands till elbows for a surgical hand washing

5. Water should always flow from hands towards elbow after a scrub

6. Always use a towel, gown and gloves which is sterile

How to manage when a person in surgical team is infected?

- Educate them to report to the team head
- Developing well-defined policies concerning patient care
- Surgical personnel with draining skin:
    - Must provide and collect cultures
    - Abstain from duty, until infection has been subsided
    - or adequate antimicrobial therapy provided

Principles of prophylaxis:

Use of multiple methods (physical, chemical, and antimicrobial therapies) or a combination of these to decrease the presence of exogenous factors (surgeon and operating room environment) and endogenous factors (microorganisms) is called *prophylaxis*.

Effective Source control:

The primary concept in the treatment of surgical site infections includes:

- ✓ drainage of pus
- ✓ wound débridement including infected and devitalized tissue
- ✓ extrusion of foreign bodies
- ✓ treatment of the root cause of infection.

Prophylactic antibiotic treatment

The usage of empirical antibiotics before a surgery or during and sometimes even after a surgery to prevent complications of infections.

Therapeutic antibiotic treatment

The usage of substances that decrease the growth or multiplication of organisms, which also includes its eradication . Thus, it reduces infection caused not only by a pathogen but also the infection caused by the organism which colonises a gut or skin of the patient.

Antibiotic Prophylaxis:

Antibiotic prophylaxis was first proposed by Miles and Burk in 1950.

Prophylaxis should be planned so that it is administered at the time of induction or skin incision. Because,

- after 3 hrs of entry of infectious agent, it becomes very ineffective.
- Concentration of organisms > 100,000 / gm of tissue usually exceed the capacity of host defense.
- In the body, Humoral or cellular mechanisms defeat bacteria.

What are the Principles behind prophylaxis

- Always use the antibiotic agent which is likely to cause the probable infection
- Use full dose of any antibiotic chosen
- Administer the chosen drug prophylactically
- If duration of operation is prolonged for more than 3 hrs, give another dose of the chosen antibiotic.
- Employ post operative antibiotic, when the risk of infection is increased.

"The consensus is that a single dose of antibiotic immediately before an operation is enough and that there are dangers not only to hospital

but also to the patients in prolonged course of prophylactic antibiotics. Resistance to antibiotics is related closely to the prolificity with which antibiotics are prescribed”

Single dose prophylaxis

In 1977, STRACHAN and his colleagues first proposed single dose antibiotic prophylaxis. They proposed single dose of broad spectrum antibiotic prior to surgery without any usage of it after the procedure.

Trial of single dose vs no antibiotic:

In one of the study conducted, comparison was done between single dose of preoperative antibiotic (cefazolin) against 5 days of post operative treatment of the same. Infection rate of prophylactic group was about 3% and in the other group where post operative antibiotic was given the infection rate was 5%.

Trial of Single dose vs. Multiple dose of antibiotics:

Comparison was done between patients undergoing Colonic surgery receiving single dose of prophylactic antibiotic against multiple doses of antibiotics. Out of 510 surgeries done in single dose group,

infection rate was 4.3% and in the group of 493 patients who received multiple doses of antibiotic, the infection rate was 6.9%.

Results of 27 studies conducted were as follows:

	Single dose	Multiple doses
operation	510	493
infection	22	34
Rate of infection	4.3%	6.9%

Antibiotic prophylaxis and its possible risks? :

Patients with a history of allergy, urticaria or pruritic rash, bronchospasm, hypotension, local swelling, laryngeal oedema occurring even after a single dose of penicillin injection have a potential risk of anaphylaxis (type I immediate hypersensitivity). So recommendation of beta-lactams as a prophylactic antibiotic is highly condemnable.

For patients with allergy to penicillins or cephalosporins, alternative antibiotics, according to the nature of infection, has been formulated. These are very important as far as the patient's safety is concerned, failure of which may lead to a disaster.

WHO Model List – 2003

This list contains only 25 essential antibiotics for controlling most of the surgical site infections.

For routine use – 19 antibiotics were recommended.

For complementary use – 6 have been recommended.

NARROW SPECTRUM AGENTS

- **Gram positive agents include:**

  Penicillin

  Cloxacillin

  Erythromycin

  Clindamycin

  Vancomycin

- **Gram negative**

  Gentamycin

  Ciprofloxacin

  Spectinomycin

  Nitrofurantoin

  Nalidixic acid

Ceftriaxone

Ceftazidime

- **EXTENDED SPECTRUM ANTIBIOTICS**

It includes antibiotics for both Gram + ve and Gram –ve organisms.

Ampicillin

Amoxycillin

Cotrimoxazole

Trimethoprim

Sulphadiazine

Amoxicillin + clavulanic acid

Imipenam +cilastatin

BROAD SPECTRUM ANTIBIOTICS

Doxycyclin

Chloramphenicol

For Anaerobic infections:

- Metronidazole

When to administer Antimicrobial prophylaxis ?

Administer the antibiotic by an intravenous route

How to administer?

a) Prophylaxis must be planned such that maximum bactericidal concentration of the agent reaches the serum and the tissues while putting an incision on the skin.

b) Also it is important to maintain the serum concentration of the drug till the surgery is over.

• Agent	• Initiation of 1st dose
• Most antibiotics	• Within 60 minutes before incision
• fluoroquinolone or vancomycin	• Within 90-120 minutes before incision

Prophylactic Use of Antibiotics		
Site	Antibiotic	Alternative (e.g., penicillin allergic)
Cardiovascular surgery	Cefazolin, cefuroxime	Vancomycin
Gastroduodenal area	Cefazolin, cefotetan, cefoxitin, ampicillin-sulbactam	Fluoroquinolone
Biliary tract with active infection (e.g., cholecystitis)	cefaperazone-sulbactam, piptaz and clavulanic acid with ticarcillin	Quinolone group with metronidazole or quinolones along with clindamycin
Colorectal surgery, obstructed small bowel	Cefazolin plus metronidazole, ertapenem, ticarcillin-clavulanate, piperacillin-tazobactam	Gentamicin / fluoroquinolone plus clindamycin or metronidazole
Head and neck	Cefazolin	Aminoglycoside plus clindamycin
Neurosurgical procedures	Cefazolin	Vancomycin
Orthopedic surgery	Cefazolin, ceftriaxone	Vancomycin
Breast, hernia	Cefazolin	Vancomycin

(Courtesy: Schwartz principles of surgery 9th edition)

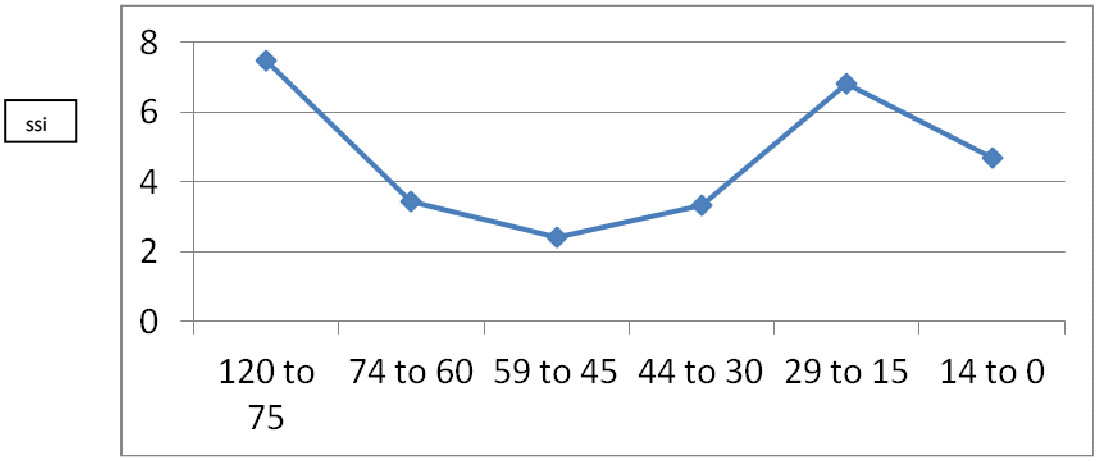
Timing of Antimicrobial Prophylaxis

According to a Prospective Observational study conducted, Consecutive surgical patients were studied over a 1 year period which included 3836 various surgeries performed.

All patients received 1.5g cefuroxime as antimicrobial prophylaxis during the study.

In all the osteosynthesis operations been done, additional 0.75g cefuroxime at 8 hours and 16 hours after a initial dose of antibiotic.

- Doses were adjusted in patients with renal failure.
- The exact timing in minutes was recorded.
- Incidence rates of SSI were recorded



According to that study,

- When antibiotic was administered 0 to 30 minutes before incision, P value was < 0.001.
- When the same was administered 60 to 120 minutes before incision, the reported P value was equal to 0.035.
- Hence it was concluded that it is better to give prophylaxis half an hour before any surgical procedure.

Intra-operative measures to prevent SSI

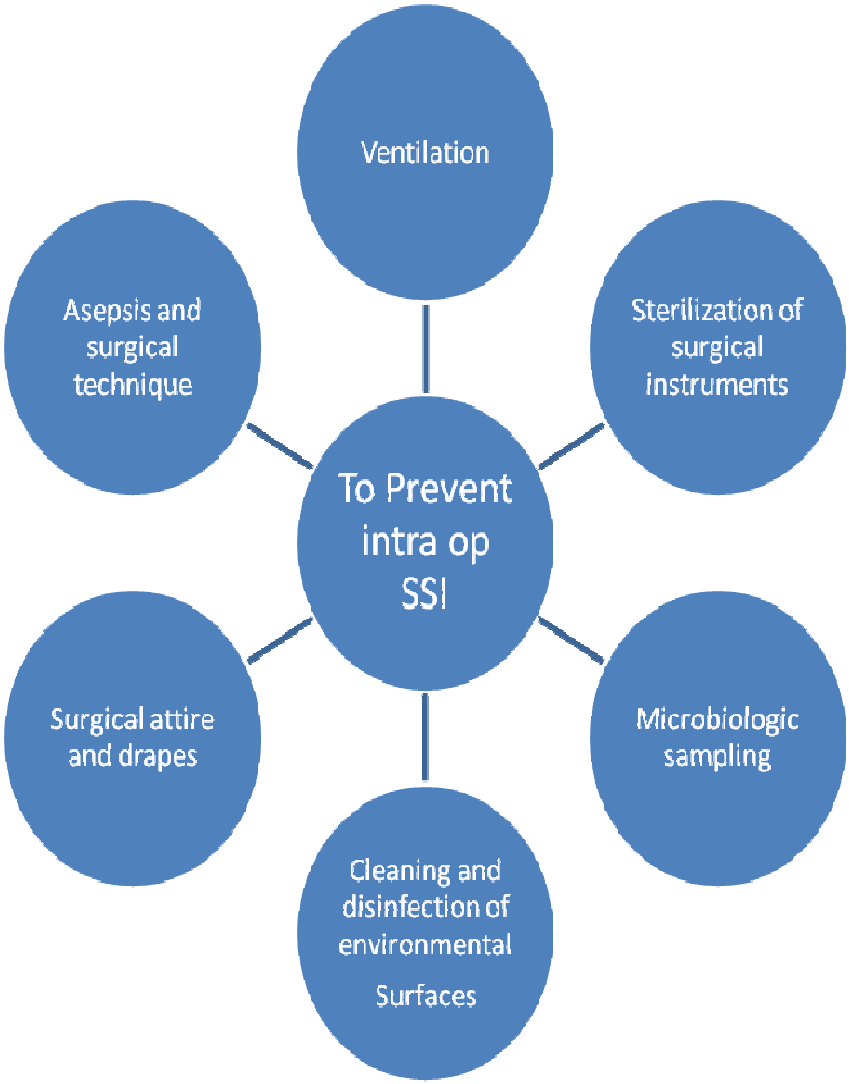


FIGURE 10Intra-operative measures to prevent SSI

Ventilation in Operation Theatre

- It is very important to maintain ventilation in operative theatres as it is essential step to prevent surgical site infection intra operatively.

- There are certain criteria which include:

➢ *Air cycles flow inside the theatre must be a minimum of 5 per hour [atleast 3 fresh air]*

➢ *The recirculated air must pass first through an appropriate filter and then flowed into the operating room.*

➢ *positive pressure must be maintained in operation theatre with a comparative negative pressure outside the area*

➢ *Always it is preferable to Keep the door closed unless when needed for passage of persons inside the room.*

➢ *Always the passage of air must be Air from the ceiling and the exhaust must be near the floor of the theatre.*

➢ *Except for the surgical operating team, the number of persons inside the theatre must be kept to a minimum. Next is an important point to remember as it is not advisable to use UV rays inside the operating room to prevent infection*

<u>Cleaning and disinfection of environmental surfaces</u>

- *When the theatre is soiled or contaminated, use appropriate antiseptic or antibiotic for cleaning before next surgery*
- *Never close the theatre without cleaning after a contaminated or dirty operation.*

Microbiological Sampling

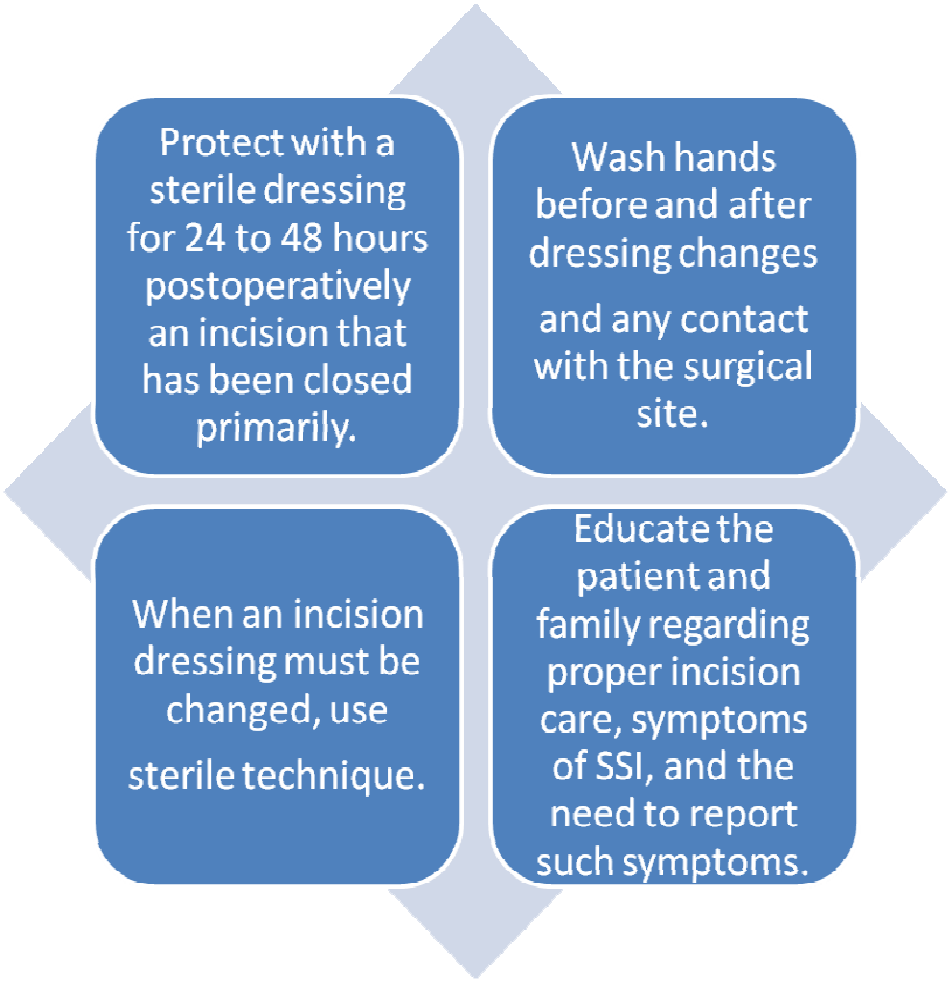
- sampling of the operating room must be performed on a regular basis
- surgical instruments must be sterilized periodically according to specific guidelines
- Flash sterilization is done for the instruments that must be used immediately after a previous surgery
- Never do flash sterilization on a routine basis and it is always advisable to keep an additional set of instruments for emergency purposes.

Surgical attire and drapes

- Cover the nostrils and mouth using a mask inside the theatre
- Until the surgery is over, it is essential to wear a mask.

- Cap that is worn must fully cover the hair of the surgeon and assistant.
- Gloves used must be sterile.
- Gloves are wore after surgical draping
- Contaminated or a visibly unsterile surgical gowns must not be worn and always discarded
- Strict aseptic technique must be maintained.
- It is important to thoroughly wash the wound so that devitalized or dead tissue is effectively debrided.
- Foreign body when present must be removed immediately.
- Perfect hemostasis must be maintained
- It is advisable that a heavily contaminated wound is left open and is allowed to close by secondary intention.
- It is essential to maintain wound hygiene. Post-operative care of the incision must be done and kept clean

Figure 11 - Wound Surveillance measures



Surveillance

- standard definitions must be used to define and categorise SSIs
- Classification of wound must be done at the end of operation.

- Operating surgeon must be informed of the type and classification of infection
- Surveillance of the wound may be required even after the discharge of the patient and followed up regularly.
- According to Hospital Surgical Surveillance Programme, Strict CDC definitions must be used to classify the wound
- Most of the patients are not admitted to the hospital
- When discharged in the early post op period, patient must be asked to follow up in the outpatient department till 30 days of surgery
- Appropriate number of nurses specially trained to identify infection control must be allotted
- Periodical reporting of infection rates must be done.

Innovative Strategies to Reduce Infection Within the hospital Environment

Though there are studies that show results of decrease in infection rates with the usage of impregnated technologies, it is not been proved beyond doubt of its significance.

Thus the impregnated technologies used is of doubtful value.

"Antibiotic for the fool is a tool which appears cool. But somebody pays the price as a rule"

Postoperative Nosocomial Infections

- Postoperative Nosocomial Infections include:
  - Respiratory infections
  - Urinary tract infections
  - Surgical site infections and
  - Septic episodes.
- Nosocomial infections are due to usage of catheters, instrumentation, intra venous and intra arterial access (venflons) and central venous pressure lines.
- UTI is confirmed by demonstrating WBCs or bacteria in routine urine examination or a positive test for leukocyte esterase, or a combination of these two.

Table- UTI confirmation

patients	Culture value of organism

	obtained
symptomatic patients	$>10^4$ CFU/mL
asymptomatic individuals	$>10^5$ CFU/mL

- It is important that urinary catheters be removed as quickly as possible within24 to 48 hours, as long as they are ambulant.
- Pneumonia may be due to prolonged mechanical ventilation and is due to pathogens common in the hospital atmosphere.
- Hospital-acquired pneumonia is diagnosed by the presence of a purulent sputum, leukocytosis, fever of very high grade and chest x-ray changes.
- Bronchoalveolar lavage must be done to obtain samples and the material is subjected to Gram's stain and culture to identify the microbes.
- Weaning from mechanical ventilation should be done as soon as possible..
- Most patients with intravascular catheter infections are asymptomatic, except for an increase in the blood WBC count.

- ❖ Presence of the same organism in the blood cultures of a patient obtained from a peripheral site and through the catheter tells the high index of suspicion.
- ❖ severe sepsis or bacteremia due to gram-negative aerobes or fungi necessitates catheter removal.
- ❖ Catheter infections due to *S. epidermidis* can be effectively treated with a 14- to 21-day course of an antibiotic

Post operative wound sepsis

Post operative wound sepsis continues to account for 14% of adverse events in hospitalized patients

Increases Morbidity,

Hospital Stay,

Expensive Antibiotic use and

Wastage of manpower

The inability to deliver antibiotics to the under perfused tissue during surgery because of vasoconstriction, hypoxia and shock renders systemic post op antibiotics less effective

Prophylactic antibiotics

- Patients receiving pre-operative antibiotics had significantly *fewer* infections than patients receiving antibiotics either too early or postoperatively

In order to avoid these problems, rational ANTIBIOTIC prophylaxis is designed to deliver the antibiotics to the undamaged tissue *BEFORE CONTAMINATION* occurs

MECHANISM of PREOPERATIVE ANTIBIOTICS

Antibiotics preoperatively diffuse into the peripheral compartment and wound fluid

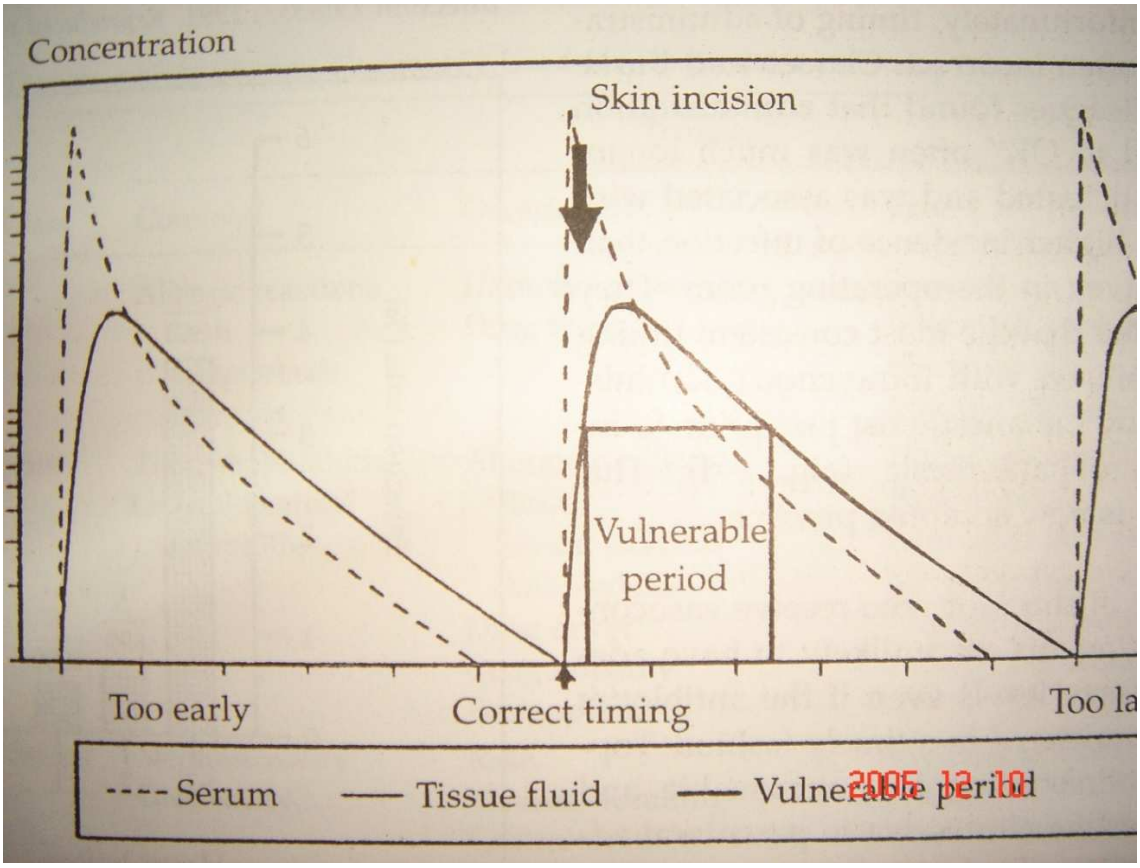
This saturated antimicrobials kill and preventing the invading bacteria and bacterial multiplication

GOALS OF ANTIBIOTIC THERAPY

1. To maintain the maximum concentration of agent in the serum and also the tissues which is more than the MIC (minimal inhibitory concentration) by 3-4 times for not less than three quarters of time during surgery.

MIC – The minimum concentration of antibiotic to kill 99% of organisms.

2. Use full doses of chosen antibiotic in the DECISIVE period (The vulnerable period during surgery)



CHOICE OF ANTIBIOTIC

1. Maintain effective antibiotic level throughout the procedure
2. Less adverse effects
3. Less interference with anaesthetic drugs

4. Cost effective
5. Broad spectrum to pathogens
6. Less interference with host defense

Antibiotics commonly used in the prophylaxis

1. Penicillins
2. Flucloxacillin and methicillin
3. Ampicillin and amoxycillin
4. Mezlocillin and azlocillin
5. Cephalosporins
6. Aminoglycosides
7. Vancomycin
8. Imidazoles
9. Carbapenem
10. quinolones

<u>THE ROUTE OF PROPHYLAXIS</u>

The route of prophylaxis will depend on the level of contamination. The preference of the surgeon and the reliability of the ancillary care. Both topical and parenteral administration have shown benefit in reducing wound infections when properly administered.

TIMING

Most consistent timing was achieved with iv administration by the anesthetist just prior to induction of anesthesia or 30 min prior to the incision

FOR PROLONGED PROCEDURES

Antibiotics should be repeated every 4 hrs

Antibiotics should be continued for 24-48 hrs postoperatively in clean contaminated cases

For dirty wounds, antibiotics should be continued for 5-7days

INDICATIONS

1. Patients undergoing clean operations who are at risk (ex. Patients undergoing hernia surgery with co- morbidities like diabetes mellitus, hypertension)

2. Prosthesis insertion (mesh repair in hernia surgery, insertion of drain in thyroidectomy or breast surgeries)

3. Clean Contaminated operations

4. contaminated operations

TOPICAL ANTIBIOTIC PROPHYLAXIS

Topical application consists of instilling antibiotic in the wound upon opening each tissue plane and at frequent intervals throughout the entire operation

Only effective when they are constantly present on the surface of the wound ready to tackle the infective organisms Eg.,

Topical Sulfanilide on open fractures

Topical Aminoglycoside

In practice, 0.1 % solution of first generation cephalosporin is an excellent choice

Aminoglycosides are frequently used but they have two disadvantages

a) Systemic absorption leads to toxicity

b) Anaerobes cannot be killed regardless of concentrations

COMPLICATIONS

The most feared complications are *anaphylaxis* and *death*

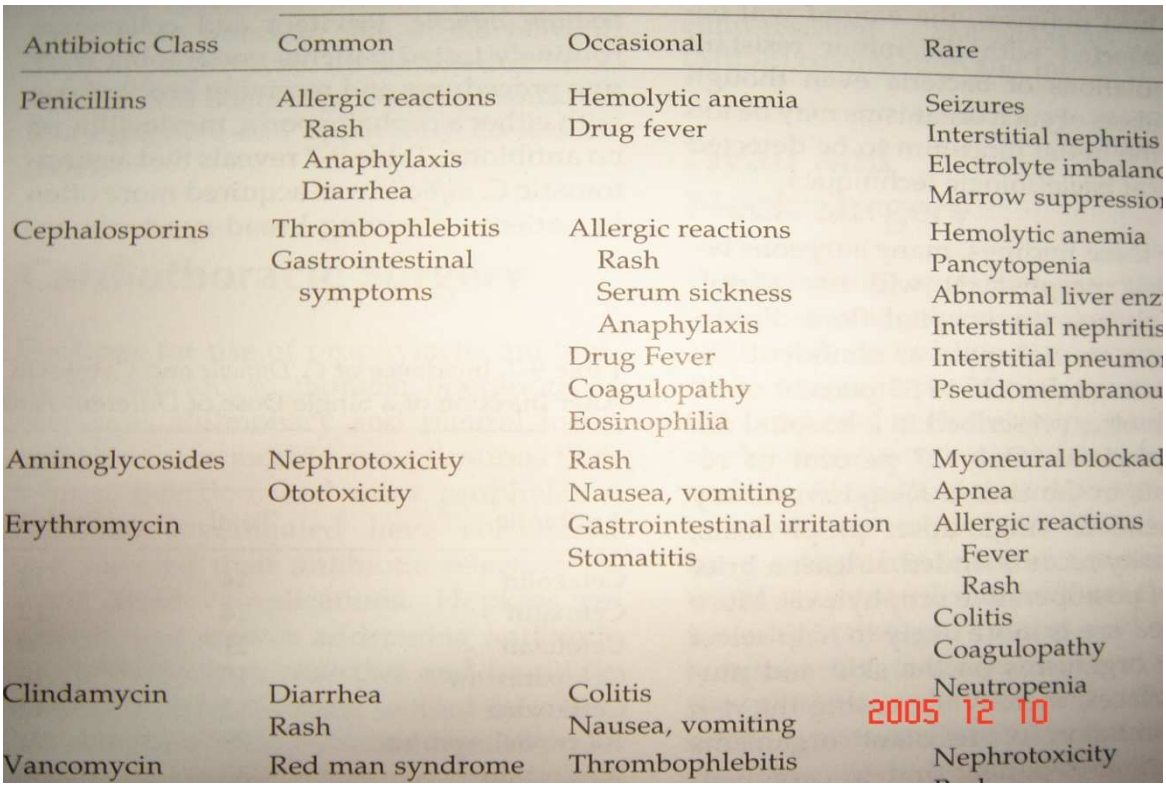
Most commonly associated with the b-lactam antibiotics including the penicillins, cephalosporins, carbapenem and monobactam

Vancomycin occasionally produces red man syndrome

Cephalosporins can occasionally cause hypoprothrombinemia and bleeding. Nephrotoxicity and ototoxicity make aminoglycosides poor choice for prophylaxis

They have ability to produce myoneural blockade and apnoea when given concomitantly with muscle relaxants particularly succinyl choline.

Figure 12 – Side effects of prophylactic Antibiotics



Antibiotic Class	Common	Occasional	Rare
Penicillins	Allergic reactions Rash Anaphylaxis Diarrhea	Hemolytic anemia Drug fever	Seizures Interstitial nephritis Electrolyte imbalanc Marrow suppressio
Cephalosporins	Thrombophlebitis Gastrointestinal symptoms	Allergic reactions Rash Serum sickness Anaphylaxis Drug Fever Coagulopathy Eosinophilia	Hemolytic anemia Pancytopenia Abnormal liver enz Interstitial nephritis Interstitial pneumo Pseudomembranou
Aminoglycosides	Nephrotoxicity Ototoxicity	Rash	Myoneural blockad
Erythromycin		Nausea, vomiting Gastrointestinal irritation Stomatitis	Apnea Allergic reactions Fever Rash Colitis Coagulopathy
Clindamycin	Diarrhea Rash	Colitis Nausea, vomiting	Neutropenia
Vancomycin	Red man syndrome	Thrombophlebitis	Nephrotoxicity

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THE KEY TO SUCESSFUL PROPHYLAXIS

Prophylaxis should be limited to perioperative administration only.

A single perioperative dose or continuous administration if topical antibiotic is chosen

Short course prophylaxis will be better

Prophylactic antibiotics are not an excuse for poor technique

MATERIALS AND METHODS

Source of data:

Patients admitted to Govt. Rajaji hospital Madurai from June 2011 to June 2012 for clean general surgical operations were included with the consent obtained from the hospital ethical committee meeting conducted by the board members.

Type of study:

Prospective interventional study

Sample size:

Totally 100 patients were selected.

Out of 100, 50 patients were allotted in study group and the remaining 50 in control group.

Methods used for allocation:

Allocation of patients were done randomly. No specific selection of cases into study or control group was done.

Inclusion criteria:

Patients who had to undergo the following procedures were included. Hernia repair (open and laparoscopic approaches), breast surgeries (modified radical mastectomy for carcinoma breast and excision biopsies for fibroadenoma breast), neck surgeries (total thyroidectomy for multinodular goitre and hemithyroidectomy for solitary nodular goitre, excision biopsy of lipoma nape of neck) and scrotal surgeries (eversion of sac for hydrocele and excision for epididymal cyst).

Administration of prophylaxis:

Study Group:

Injection Cefotaxim 1g IV was given 30 minutes before operation.

Control group:

No antibiotics were given pre operatively.

- Similar techniques were followed for both groups to rule out any bias.
- Strict asepsis were handled for both the groups.
- Blinding (which prevents patients from allocation into specific groups) was done again to rule out bias.

Exclusion criteria:

- Patients who are diabetic, hypertensive or consuming medications for any other specific medical conditions
- Patients who are Immunologically compromised
- Patients who are Chronic malnourished
- Patients undergoing contaminated or clean contaminated surgeries
- History of fever, cough with expectoration

Patients were examined for presence of

- Erythema & Redness +/_
- Induration
- Fever +/_
- Stitch Abscess / Granuloma +/_
- Wound gaping or discharge +/_

❖ Patients with above findings were investigated and Complete blood count and Pus Culture & Sensitivity were sent.

❖ Statistical analysis was done by standard statistical and clinical methods and data were analysed.

OBSERVATION AND RESULTS

Table-1

SURGERIES INCLUDED IN STUDY

S.NO.	PROCEDURE	STUDY	CONTROL
1	Hernia repair	26	25
	open hernioplasty	23	21
	laparoscopic hernioplasty	3	4

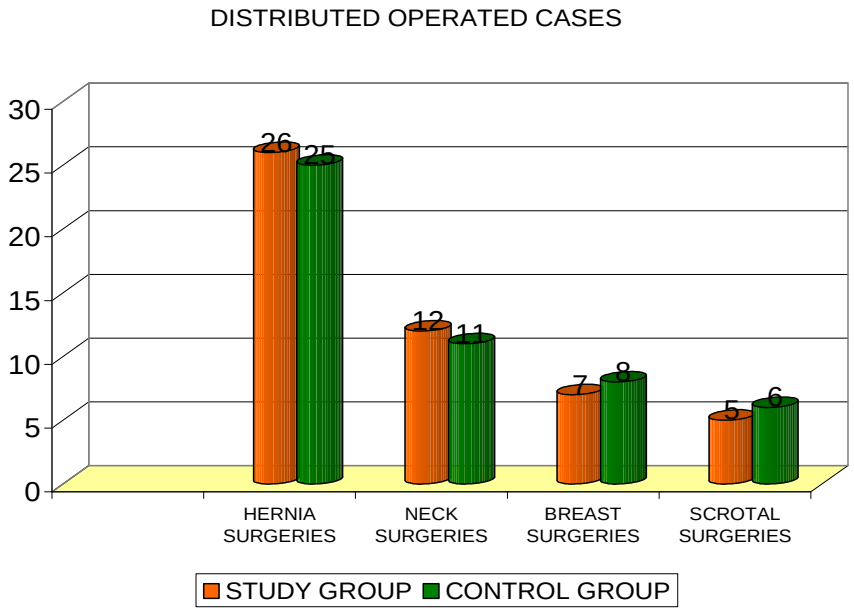
2	Neck Thyroid surgeries Lipoma nape of neck	12 6 6	11 7 4
3	Breast Modified radical mastectomy Excision biopsy	7 4 3	8 5 3
4	Scrotal surgeries Hydrocele Epididymal cyst excision	5 4 1	6 5 1
6	TOTAL	50	50

TABLE-2

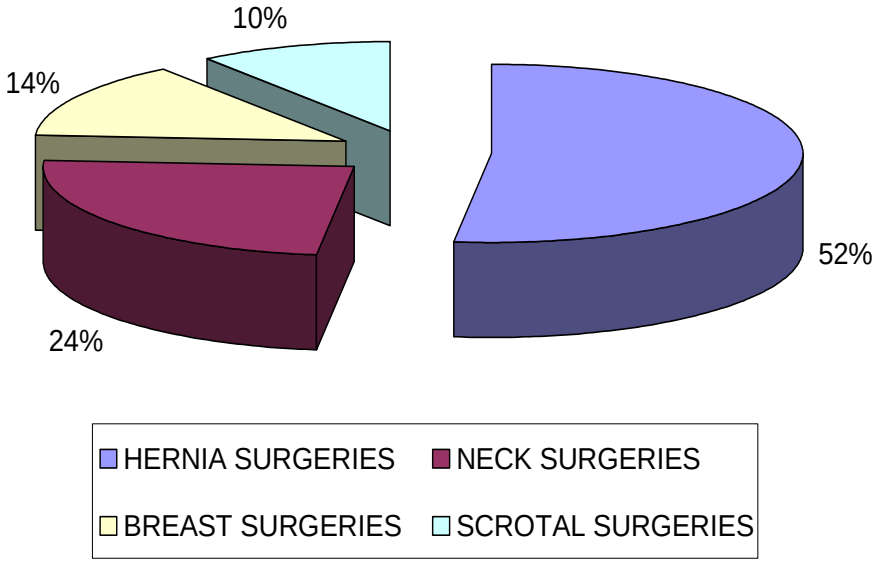
CASE DISTRIBUTION

S. NO	PROCEDURES	STUDY GROUP	CONTROL GROUP	TOTAL
1.	HERNIA SURGERIES	26	25	51
2.	NECK SURGERIES	12	11	23
3.	BREAST	7	8	15

	SURGERIES			
4.	SCROTAL SURGERIES	5	6	11
		50	50	100



PROCEDURES (STUDY GROUP)



PROCEDURES (CONTROL GROUP)

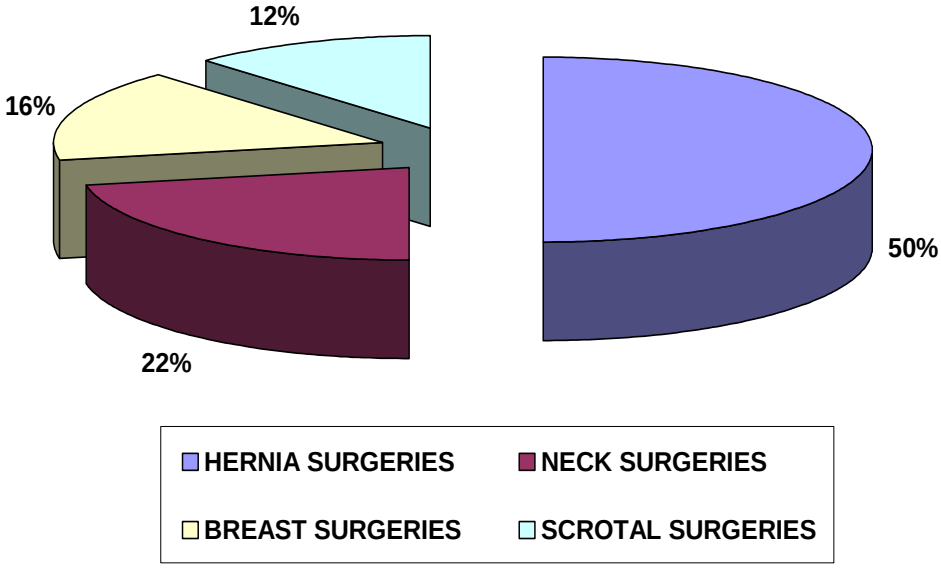


TABLE – 3

AGE DISTRIBUTION OF PATIENTS

Age Distribution	Study Group		Control Group	
	No.of cases	%	No.of cases	%
< 40 years	18	36	20	40
40 - 60 years	24	48	27	54
> 60 years	8	16	3	6

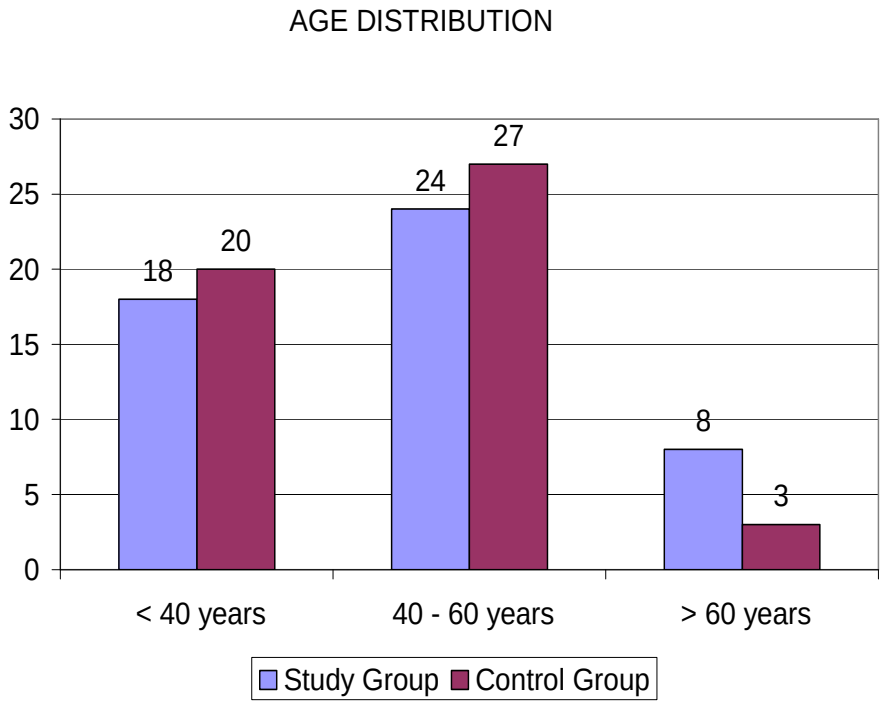


Table 4

Sex distribution of patient

Sex Distribution	Study Group	Control Group
Male	37	34
Female	13	16

Table-5

WOUND INFECTION RATE OF PATIENTS

Wound Infection	Study Group	Study %	Control Group	Control %
SSI +	3	6	6	12
SSI -	47	94	44	88

P value - 0.452 Not significant

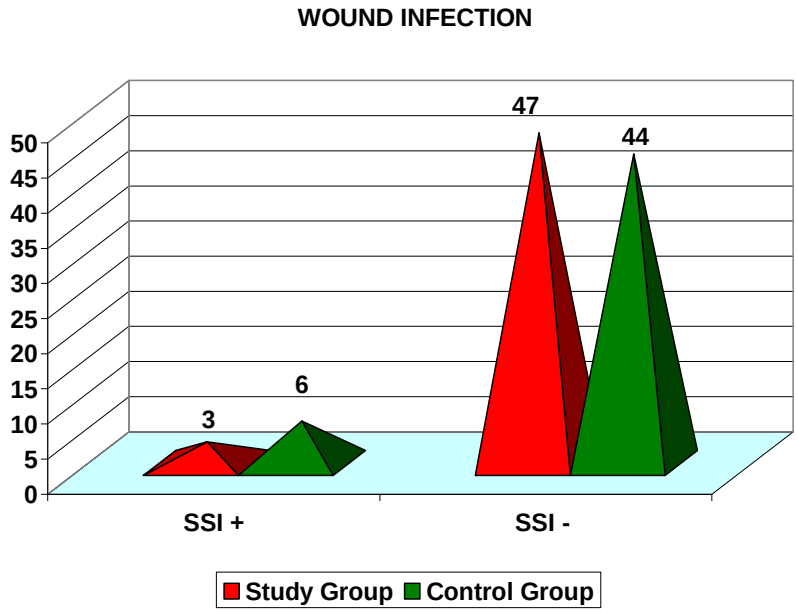

WOUND INFECTION
50
45
40
35
30
25
20
15
10
5
0
3
6
47
44
SSI +
SSI -
Study Group
Control Group

Table – 6

TYPE OF SSI

Type of SSI	Study Group	Control Group
Superficial Incisional	2	4
Deep Incisional	1	2
Organ / Space	0	0

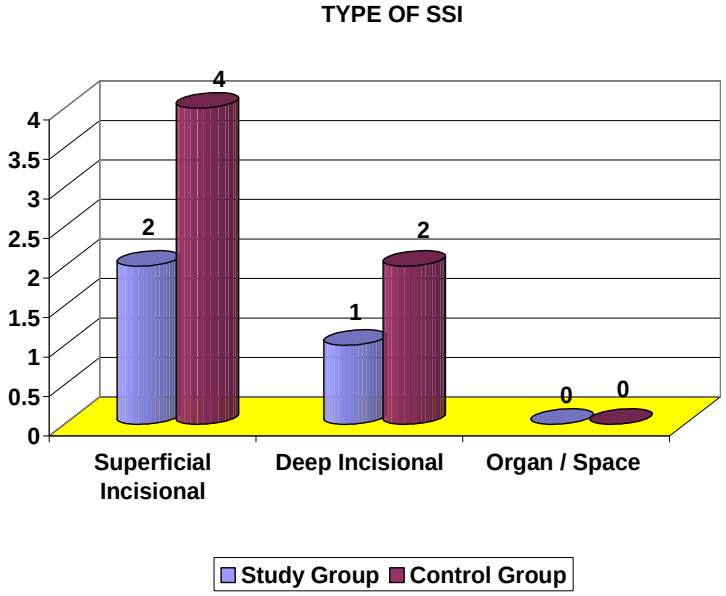


TABLE 7

ISOLATES FROM SSI

Isolates from SSI	Study Group	Control Group
STAPHYLOCOCCUS AUREUS	2	3
KLEBSIELLA PNEUMONIA	0	1
ESCHERICHIA COLI	1	1
PSEUDOMONAS AERUGINOSA	0	1

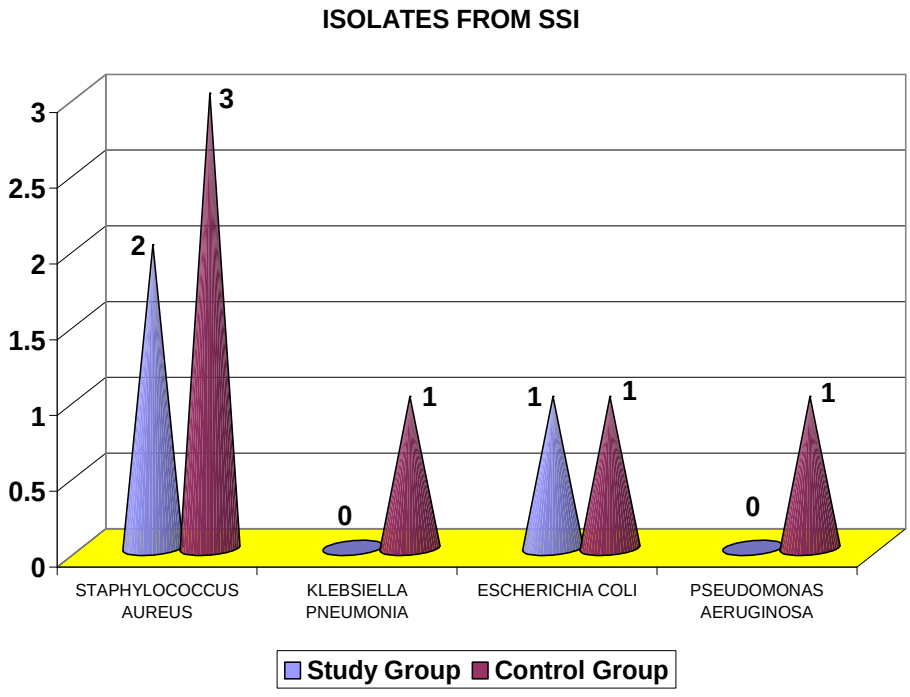


TABLE 8

DURATION OF SURGERY

Duration of Surgery	Study Group	Control Group
< 1.5 hrs	36	23
> 1.5 hrs	14	27

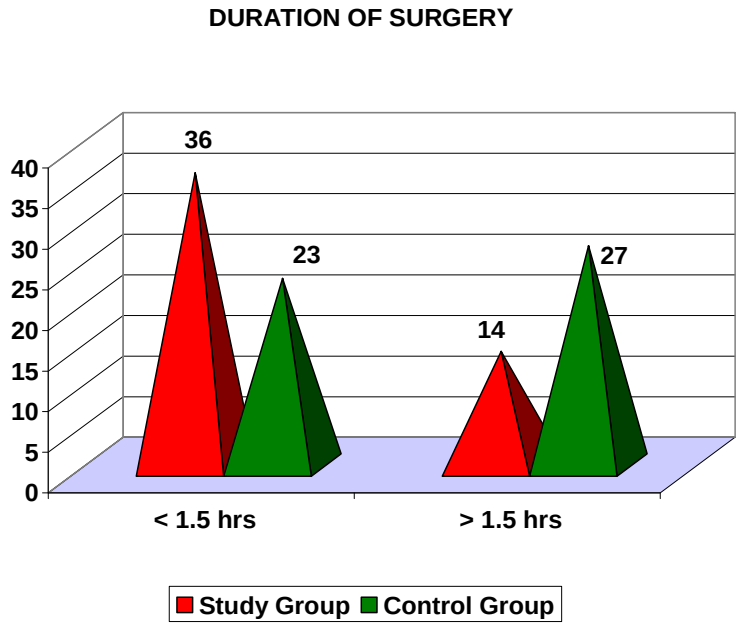
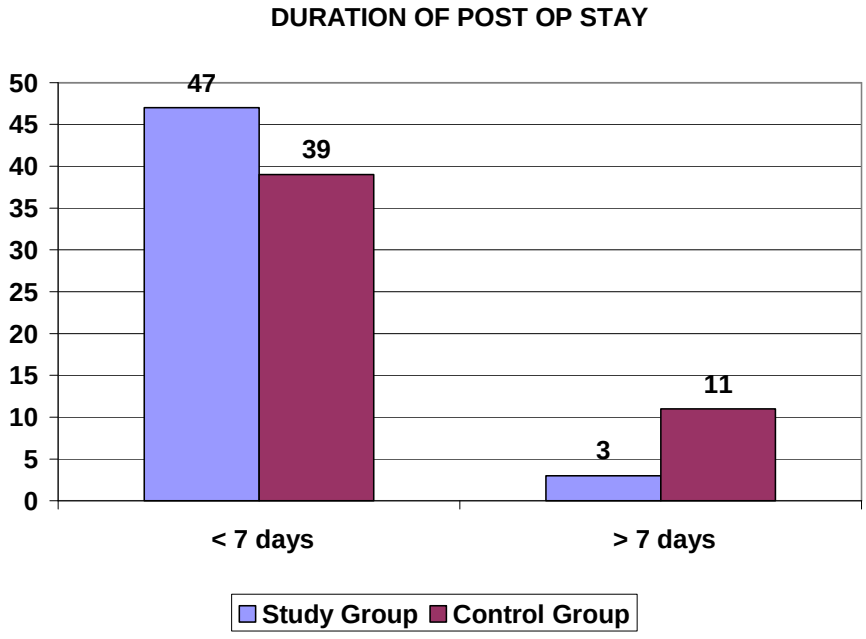


TABLE 9:

POST OP STAY OF PATIENTS

Duration of Post op Stay	Study Group	Control Group
< 7 days	47	39
> 7 days	3	11



QUICK DISCUSSION AND SUMMARY

The term Clean surgeries describes the procedures where in a sterile technique is strictly adopted and any of the tracts like GIT, respiratory and genitor-urinary tracts are not entered.

Apart from the factors like the operating team and the risk factors of the patient which contributes to the risk of infection, the operating atmosphere and the sterility of the instruments and the effort which is taken to maintain asepsis also interferes with the rate of surgical infection.

It is rather not fair for a surgeon to prescribe an antibiotic when there is any breach in the technique of asepsis as it is never a substitute to asepsis. In a clean surgery, the infection is almost always entered the operative field from an exogenous source like skin of the patient or the nostrils of the operating team.

In this study the factors like hypertension, diabetes mellitus or any other co-morbities, immunocompromised state, malnutrition, previous surgeries, hypersensitivity to any antimicrobial agents have been excluded. As per the literature, the rate of infection after a clean surgery is 1.5% and is hardly more than 4%.

According to the study performed in our institution, the rate of infection in the study group i.e., the patients who received a prophylactic antibiotic was 6%. 3 out of 50 patients developed an infection among which 2 had superficial incisional SSI. In the group who never received an antibiotic prophylactically, 6 out of 50 patients (12%) developed an infection of which 4 developed a superficial incisional SSI and the remaining deep incisional SSI. None of the patients in both groups developed an organ or space SSI. 48% of the patients in the study group and 54% of the patients in the control group were in the age group of 40 to 60 years with no significant co morbid conditions.

Organisms obtained from the isolates of patients from both the study group and the control group were predominantly staphylococcus aureus. Other organisms obtained were klebsiella pneumonia and escgerichia coli. The difference in the infection rate of both the groups was not significant statistically as the p value obtained from the chi square test was 0.452(p value becomes significant when it is less than 0.05). This was actually similar to some studies performed in Rawalpindi, Pakistan for a similar set of clean and uncontaminated surgeries in a military hospital.

But according to Platt et al, who conducted a study to evaluate the use of perioperative prophylaxis in clean surgeries, there was an absolute decrease in the risk of surgical site infection to approximately 50%. In this study, the sample size (n = 1000) was sufficiently larger than our study. More the number of procedures performed, more the sample size, more the power of study which makes the results of study considerably reliable. Also from such randomised trials performed the regimens for specific surgical infections can be devised.

Regimens usually successful are those which are

a) Available at a cheaper cost to the patient.
b) Remains in the serum for a longer time (half life).
c) Considerable activity against organisms which are usually found in the nostrils and skin of the health care personnels.

Though the drug cefazolin serves the above purpose and been used nowadays for many clean and uncontaminated surgeries, the best agent for prophylaxis varies according to the type of surgery performed and the likely source of infection.

Apart from the efficacy of the antibiotics used to treat or prevent a surgical site infection, the important factor which helps a surgeon to

choose an antibiotic is its cost. Nowadays, antimicrobial agents have been misused in inpatient setup. This is also similar in an outpatient set up as ‘over the counter’ drugs. Antibiotic misuse gives an economic burden in a society due to increased costs in health care services. It also leads to newer infections like antibiotic associated diarrhoea caused by clostridium difficile. Emergence of multi drug resistant strains and organisms like “ super bugs” which are resistant to all but few anti microbial agents makes the already worsened situated more sober.

A responsible surgeon must weigh the potential risks and advantages of giving an antibiotic after a particular procedure, especially a clean and uncontaminated surgery where the chance of infection rate is very minimal and act accordingly.

Improvements in the quality of medical care can only be accomplished by proper usage of an antibiotic which is effective in preventing and controlling an infection. Optimal regimens for treating a surgical site infection must be tailored based on whom and what procedure is been performed as it takes a heavy toll on the economy.

CONCLUSION

According to the results of this study whish evaluated the role of prophylactic antibiotics to prevent surgical site infections in clean surgeries which included hernia repair (both open and laparoscopic), neck surgeries (thyroid surgeries and lipoma), breast surgeries (modified radical mastectomy and fibroadenoma excision) and scrotal surgeries (hydrocele and epididymal cyst excision), the rate of surgical site infection in the group which received prophylactic antibiotic (study group) was 6% and the one which did not receive any antibiotic prior to surgery developed 12% of wound infection rate. This difference in the rate of infection is not significant statistically as the p value was 0.452 (>0.05) obtained by the test of significance (chi square test).

Thus we come to a conclusion that for a clean and uncontaminated surgery, the use of antibiotics prophylactically does not cause a significant reduction in the rate of surgical site infection. Also in literature, it is not established that prophylactic antibiotics for clean surgeries in general surgery reduce the infection rate as in clean contaminated and contaminated surgeries where its role is extensively studied and its reduction in rate of surgical site infection is strongly established.

Thus to conclude, according to this study performed, prophylactic antibiotics, unless warranted, has no significant role in clean elective surgeries.

BIBLIOGRAPHY

1. Abdominal surgical site infections: incidence and risk factors at an Iranian teaching hospital Seyd Mansour Razavi[1] , Mohammad Ibrahimpoor[2], Ahmad Sabouri Kashani[3] and Ali Jafarian[4] *BMC Surgery* 2005, 5:2doi:10.1186/1471-2482-5-2

2. Troillet N, Petignant C, Matter M, Eisenring MC, Mosimann F, Francioli P: Surgical site infection surveillance: an effective preventive measure. *Rev Med Suisse Romande* 2001, 121(2):125-8.

3. BurkittJf: Identification of the sources of staphylococci contaminating the surgical wound during operation. *Ann Surg* 1963, 158:898-904.

4. Schwartz SI, Comshires G, Spencer FC, Dally GN, Fischer J, Galloway AC: *Principles of surgery.* 7th edition. NY: McGraw-Hill companies; 1999:83.

5. Habte-Gabr E, Gedebau M, Kronvall G: Hospital-acquired infections among surgical patients in TikurAnbessa Hospital, Addis Ababa, Ethiopia. *Am J Infect Control* 1988, 7-13.

6. Lecuona M, Torres Lana A, Delgado-Rodriguez M, Llorc J, Sierra A: Risk factors for surgical site infections diagnosed after hospital discharge. *J Hosp Infect* 1988, 39(1):71-4.

7. Nystrom PO, Jonstam A, Hojer H, Ling L: Incision infection after colorectal surgery in obese patients. *Actachirscand* 1987, 153(3):225-7.

8. Nichols RL: Preventing surgical site infections: A Surgeon's Perspective. *Emerg Infect Dis* 2001, 7(2):220-4.

9. Majidpoor A, Jabarzadeh S: Hospital acquired infections, how to control. In *Emerging, Re-emerging infectious diseases and Employee Health*. *Volume 1*. Edited by Hatami. Tehran: Ministry of health and medical education, Center for disease management; 2004:263-321.

10. Gante JE: *Manual of Antibiotics and Infectious Disease Treatment and Prevention.* 9th edition. L.W.W; 2002:630-730.

11. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR: Guidelines for Prevention of surgical site infection 1999. *Infect Control Hosp Epidemiol* 1999, 20 (4): 250-78.

12. Gilbert N, David , Moellering , Robert C, Sande , Merle A: *The Sanford Guide to antimicrobial Therapy.* Cambridge: Cambridge University Press. INC; 1998.

13. Skarzynska J, Cienciala A, Madry R, Barucha P, Kwasniak M, Wojewoda T, Sroga J: Hospital infection in general surgery wards.*PrzeglEpidemiol* 2000, 54(3–4):299-304. PubMed Abstract

14. Alvarado CJ. 2000. The Science of Hand Hygiene: A Self-Study Monograph. University of Wisconsin Medical School and Sci-Health Communications. March.

15. Cruse PJE and R Foord. 1980. The epidemiology of wound infection: A 10 year prospective study of 62,939 wounds. Surg Clin North Am 60(1): 27–40.

16. Fry DE. 2003. Surgical site infection: Pathogenesis and prevention. Medscape (February 19). Available at: www://meds cape.com / view program /2220 pnt.

17. Horan TC et al. 1992. CDC definitions of nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol 13(10): 606–608.

18. James RC and CJ MacLeod. 1961. Induction of staphylococcal infections in mice with small inocula introduced on sutures. Br J ExpPathol 42:266–272.

19. Lowry PW et al. 1991. A cluster of legionella sternal-wound infections due to postoperative topical exposure to contaminated tap water. N Engl JMed 324(2): 109–113.

20. The Medical Letter. 2001. Antimicrobial prophylaxis in surgery. TheMedical Letter 43: 1116–1117.

21. SHEA, APIC, CDC and SIS. 1990. Consensus paper on the surveillance of surgical wound infections. Infect Control Hosp Epidemiol 18(5): 599–605.

22. Classen DC, Evans RS, Pestotnik SL, Horn DH, Menlove RL, Burke JP. The timing of prophylactic administration of antibiotics and the risk of surgical wound infection. New Engl JMed 1992; 326:281-286.

23. Howard JM, Barker WF, Culbertson WR etal Postoperative wound infections: the influence of ultraviolet irradiation of the operative room and of various other factors. Ann Surg 1964;160Suppl:1-192.

24. Mangram AJ, Horan TC, Pearson ML et al. for the Hospital Infection Control Advisory Committee .Guideline for the surgical site infection.1999. Infect Control Hospepidemiol1990;20:247-280.

25. Knight R, Charbonneau P, Ratzer E, Zeren F, Haun W, Clark J. Prophylactic antibiotics are not indicated in clean general surgery cases. Am J Surg. 2001 ;182:682-6.

26. Gyssens IC. Preventing Postoperative infections: current treatment recommendations .Drugs.1999;57:175-85.

27. Weed HG Antimicrobial prophylaxis in the surgical patient. Med Clin North Am 2003;87:59-75

28. Khan SA, Rao PGM, Rao A, Rodgrigues G. Survey and evaluation of antibiotic prophylaxis usage in surgery wards of tertiary level institution before and after implementation of clinical guidelines. IndianJ Surg 2006;68:150-15

29. Barie PS, Eachempati SR. Surgical site infections. SurgClin N Am 2005;85:1115-1135.

30. Coskun H, Erisen L, Basut O. Factors affecting wound infection rates in head and neck surgery. Otolaryngol Head Neck surg 2000;123:328-333.

31. Andersen BR, Kallehave FL, Andersen HK. Antibiotics versus placebo for prevention of postoperative infection after appendicectomy. Cochrane Database Syst Rev. 2005 Jul 20;(3):CD001439.

32. Melcher GA, Ruedi TP. Duration of antibiotic treatment in surgical infections of the abdomen. Blunt abdominal trauma. Eur J Surg Suppl. 1996; (576):59-60.

33. Kanazawa H, Nagino M, Kamiya S, Komatsu S, Mayumi T, Takagi K et al. Synbioticsre duce postoperative infectious complications: a randomized controlled trail in biliary cancer patients undergoing hepatectomy. Langenbecks Arch Surg 2005; 390: 104-113.

34. Schein M, Wittmann DH, Lorenz W. Duration of antibiotic treatment in surgical infections of the abdomen. Forum statement: a plea for selective and controlled postoperative antibiotic administration. Eur J Surg Suppl. 1996;(576)

PROFORMA

ROLE OF PROPHYLACTIC ANTIBIOTIC TO PREVENT SSI IN CLEAN SURGERIES IN OUR UNIT IN GRH

Name: I.P.No :

Age & Sex: Unit :

Occupation :

Date & Time of Admission :

Date of Surgery :

Date & Time of Discharge :

Type of Surgery :

Chief Complaints :

H/o fever

H/o redness along the suture line

H/o discharge from wound

H/o swelling along the suture line

Basic Investigations :

Complete Blood Count

Pus Culture & Sensitivity

Findings

Erythema & Redness +/_

Induration

Fever +/_

Stitch Abscess / Granuloma +/_

Wound gaping +/_

Wound discharge +/_

Duration of hospital stay :

Wound infection rate :

ABBREVIATIONS USED IN MASTER CHART

SSI	-	SURGICAL SITE INFECTION
RT	-	RIGHT
LT	-	LEFT
BL	-	BILATERAL
LAP	-	LAPAROSCOPY
SNG	-	SOLITARY NODULE GOITRE
MNG	-	MULTINODULAR GOITRE
CA	-	CARCNOMA
MRM	-	MODIFIED RADICAL MASTECTOMY
SUPL	-	SUPERFICIAL
TEP	-	TOTAL EXTRA PERITONEAL REPAIR
TAPP	-	TRANS ABDOMINAL PRE PERITONEAL REPAIR

MASTER CHART FOR STUDY GROUP

S. NO	NAME	AGE	SEX	IP NO.	DIAGNOSIS	PROCEDURE	DURATION OF SURGERY	SSI	TYPE OF SSI	ISOLATES FROM SSI	DURATION OF POST-OP STAY
1	THAVAMANI	63	M	71952	LEFT DIRECT INGUINAL HERNIA	L T. OPEN HERNIOPLASTY	1.2	NO	-	-	4
2	SUBRAMANI	30	M	71971	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.3	NO	-	-	3
3	HARIKRISHNAN	65	M	72004	LEFT INDIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.3	NO	-	-	4
4	KRISHNAN	57	M	65469	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.1	NO	-	-	3
5	HANIFFA	56	M	63857	LEFT DIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.3	NO	-	-	4
6	BALAMURUGAN	22	M	78670	LEFT INDIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.2	NO	-	-	5
7	ANANDHAN	45	M	78666	RIGHT DIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.2	NO	-	-	4
8	SANKARAN	80	M	80276	RIGHT BUBONOCELE	RT. OPEN HERNIOPLASTY	2	YES	SUPL. INCISIONAL	STAPH.AUREUS	8
9	ALAGAR	26	M	80370	RIGHT CONGENITAL INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.2	NO	-	-	5
10	MURUGESAN	58	M	27341	RIGHT DIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.3	NO	-	-	4
11	KAMUSELVAM	19	M	61690	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.4	NO	-	-	5
12	RADHAKRISHNAN	32	M	11625	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.1	NO	-	-	4
13	THANGARAJ	67	M	11491	LEFT INDIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.2	NO	-	-	4

14	MANOHARAN	49	M	14873	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.2	NO	-	-	5
15	PALANIYANDI	60	M	16656	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.3	NO	-	-	5
16	PANDI	60	M	16672	LEFT INDIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.2	NO	-	-	4
17	PALPANDI	43	M	23880	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.1	NO	-	-	6
18	RANJITH	20	M	24881	LEFT DIRECT INGUINAL HERNIA	LT. OPEN HERNIOPLASTY	1.4	NO	-	-	5
19	SEKAR	53	M	21701	RIGHT INDIRECT INGUINAL HERNIA	RT. OPEN HERNIOPLASTY	1.3	NO	-	-	6
20	ALAGHU	45	M	77052	BILATERAL INGUINAL HERNIA	BL OPEN HERNIOPLASTY	1.3	NO	-	-	5
21	SINGAKUTTI	60	M	80380	BILATERAL INGUINAL HERNIA	BL OPEN HERNIOPLASTY	2.2	NO	-	-	5
22	ARUNA	65	M	79604	BILATERAL INGUINAL HERNIA	BL OPEN HERNIOPLASTY	2.1	YES	DEEP INCISIONAL	E.COLI	9
23	KARUPPIAH	60	M	13296	BILATERAL INGUINAL HERNIA	BL OPEN HERNIOPLASTY	2.3	NO	-	-	6
24	JOSUA	47	M	81340	BILATERAL INGUINAL HERNIA	LAP HERNIOPLASTY	2.5	NO	-	-	5
25	SAGAYARAJ	27	M	11490	BILATERAL INGUINAL HERNIA	LAP HERNIOPLASTY	2.7	NO	-	-	6
26	ALAGARPANDI	40	M	43619	BILATERAL INGUINAL HERNIA	LAP HERNIOPLASTY	2	NO		-	6
27	SHOBA	37	F	68678	LEFT SNG THYROID	LT.HEMITHYROIDECTOMY	1.3	NO	-	-	5
28	DEVAKI	55	F	73817	LEFT SNG THYROID	LT.HEMITHYROIDECTOMY	1.5	NO	-	-	5
29	JANAKI	60	F	57279	COLLOID GOITRE	TOTAL THYROIDECTOMY	1.7	NO	-	-	4
30	SURULIAMMAL	60	F	77033	MNG	TOTAL THYROIDECTOMY	2	NO	-	-	6
31	UDAYA KUMAR	53	M	79814	MNG	TOTAL THYROIDECTOMY	1.8	NO	-	-	6

32	SELVI	28	F	10804	MNG	TOTAL THYROIDECTOMY	1.7	NO	-	-	6
33	ARULKUMAR	35	M	72249	LIPOMA NAPE OF NECK	EXCISION	0.3	NO	-	-	1
34	KANNAN	45	M	68472	LIPOMA NAPE OF NECK	EXCISION	0.25	NO	-	-	1
35	MANIKALAI	55	M	60722	LIPOMA NAPE OF NECK	EXCISION	0.3	NO	-	-	1
36	VEERANAM	57	M	79670	LIPOMA NAPE OF NECK	EXCISION	0.2	NO	-	-	1
37	INDIRANI	32	F	36275	LIPOMA NAPE OF NECK	EXCISION	0.25	NO	-	-	1
38	BALA	70	M	63672	LIPOMA NAPE OF NECK	EXCISION	0.25	NO	-	-	1
39	SHANMUGAVALLI	40	F	12786	CA LEFT BREAST	LEFT MRM	2.3	NO	-	-	6
40	MURUGESWARI	35	F	14899	CA LEFT BREAST	LEFT MRM	2.4	NO	-	--	5
41	DANALAKSHMI	64	F	14988	CA RIGHT BREAST	RIGH MRM	1.8	NO	-	-	6
42	PREMA	39	F	23133	CA LEFT BREAST	LEFT MRM	1.4	NO	-	-	6
43	SIVAGAMI	15	F	64790	FIBROADENOMA LEFT BREAST	EXCISION	1.3	NO	-	-	2
44	MUNEESWARI	20	F	36163	FIBROADENOMA RIGHT BREAST	EXCISION	1.2	NO	-	-	3
45	TAMILSELVI	22	F	36158	FIBROADENOMA LEFT BREAST	EXCISION	1.2	NO		-	3
46	RAJENDRAN	55	M	68415	BILATERAL HYDROCELE	EVERSION OF SAC	0.8	NO	-	-	2
47	KARUPPAN	60	M	68764	BILATERAL HYDROCELE	EVERSION OF SAC	1	YES	SUPL.INCISIONAL	STAPH. AUREUS	8
48	AYYAKANNU	71	M	18652	BILATERAL HYDROCELE	EVERSION OF SAC	0.9	NO	-	-	3
49	MUTHU	17	M	78810	RIGHT HYDROCELE	EVERSION OF SAC	1	NO	-	-	4
50	ARIVALAZHAGAN	36	M	74759	LEFT EPIDIDYMAL CYST	EXCISION	0.5	NO	-	-	2

MASTER CHART FOR CONTROL GROUP

S. NO.	NAME	AGE	SEX	IP NO.	DIAGNOSIS	PROCEDURE	DURATION OF SURGERY	SSI	TYPE OF SSI	ISOLATES OF SSI	DURATION OF POST-OP STAY (DAYS)
1	AYYAN	58	M	26619	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.2	NO	-	-	4
2	SARAVANAN	36	M	30260	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.4	NO	-	-	4
3	PARAMASIVAM	55	M	24843	LEFT DIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.3	NO	-	-	5
4	JOTHIMANI	13	M	32197	LEFT CONGENITAL HERNIA	OPEN HERNIOPLASTY-LT	1.3	NO	-	-	3
5	SUBRAMANI	44	M	36141	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.7	NO	-	-	5
6	SUNDARAPANDI	20	M	36104	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.5	NO	-	-	3
7	MUTHURAKKU	57	M	36105	LEFT DIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.5	NO	-	-	5
8	DURAIPANDI	54	M	36116	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.6	NO	-	-	6
9	KANDASAMY	65	M	42059	RIGHT DIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.6	YES	SUPL. INCISIONAL	STAPH AUREUS	8
10	MOHAMED YUSUF	24	M	41771	LEFT INDIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.6	NO	-	-	3
11	SONAIMUTHU	38	M	43622	RIGHT INDIRECT HERNIA	OPEN HERNIOPLASTY-RT	1.4	NO	-	-	4
12	KARUPPUSAMY	53	M	48094	LEFT DIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.8	NO	-	-	5
13	KALAIPANDI	55	M	51789	LEFT DIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.7	YES	SUPL. INCISIONAL	STAPH AUREUS	9
14	ADHIMOOLAM	48	M	49832	LEFT DIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.8	NO	-	-	4
15	ROOBANRAJ	29	M	63680	LEFT INDIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.7	NO	-	-	6
16	AMIRTHALINGAM	24	M	63770	LEFT INDIRECT HERNIA	OPEN HERNIOPLASTY-LT	1.7	NO	-	-	7
17	BALAMURUGAN	42	M	21775	BILATERAL HERNIA	OPEN HERNIOPLASTY-`BL	1.6	NO	-	-	8
18	AZHAGAN	50	M	26690	BIL ATERAL HERNIA	OPEN HERNIOPLASTY-BL	2.1	NO	-	-	7
19	HASSAN	57	M	32164	BILATERAL HERNIA	OPEN HERNIOPLASTY-BL	2.4	YES	DEEP INCISIONAL	E.COLI	11

20	CHANDRASEKHAR	38	M	34243	BILATERAL HERNIA	OPEN HERNIOPLASTY-BL	2.1	NO	-	-	6
21	LAXMAN	45	M	38003	BILATERAL HERNIA	OPEN HERNIOPLASTY-BL	2.3	NO	-	-	4
22	SETHUPANDI	46	M	47463	BILATERAL HERNIA	TEP	2.5	NO	-	-	3
23	VELSAMY	55	M	11462	LEFT DIRECT INGUINAL HERNIA	TEP	2.6	NO	-	-	3
24	ISRAEL	50	M	26663	LEFT DIRECT INGUINAL HERNIA	TEP	2.3	NO	-	-	2
25	SUBRAMANI	40	M	32750	RIGHT BUBONOCELE	TEP	2.4	NO	-	-	3
26	RAJESWARI	54	F	11587	MNG	TOTAL THYROIDECTOMY	1.8	NO	-	-	3
27	KANNAMMAL	50	F	28514	MNG	TOTAL THYROIDECTOMY	1.7	NO	-	-	4
28	PALANIAMMAL	32	F	30275	MNG	TOTAL THYROIDECTOMY	2	NO	-	-	3
29	POORNAM	25	F	38013	MNG	TOTAL THYROIDECTOMY	1.9	NO	-	-	3
30	PALANIAMMAL	53	F	38042	MNG	TOTAL THYROIDECTOMY	2.1	NO	-	-	5
31	PECHIAMMAL	25	F	68862	LEFT SNG	LEFT HEMITHYROIDECTOMY	1.2	NO	-	-	2
32	DHANALAKSHMII	33	F	13271	RIGHT SNG	RIGHT HEMITHYROIDECTOMY	1.4	NO	-	-	2
33	MANI	58	M	36427	LIPOMA NAPE OF NECK	EXCISION	0.33	NO	-	-	1
34	MURUGESAN	36	M	13234	LIPOMA BACK	EXCISION	0.5	NO	-	-	1
35	MARIMUTHU	40	M	16478	LIPOMA NAPE OF NECK	EXCISION	0.5	NO	-	-	1
36	LAKSHMIPRIYA	19	F	67185	LIPOMA BACK	EXCISION	0.4	NO	-	-	1
37	NAGAVALLI	35	F	23033	CA RIGHT BREAST	RIGHT MRM	1.8	NO	-	-	7
38	RASATHI	47	F	19870	CA RIGHT BREAST	RIGHT MRM	1.7	YES	SUPFL. INCISIONAL	KLEBSIELLA	11
39	PANDIMEENA	46	F	50964	CA LEFT BREAST	LEFT MRM	1.8	YES	DEEP INCISIONAL	PSEUDOMONAS	13
40	TAMILSELVI	32	F	53197	CA RIGHT BREAST	RIGHT MRM	1.5	NO	-	-	8
41	SELVAM	33	F	57694	CA RIGHT BREAST	RIGHT MRM	2	NO	-	-	6
42	VASANTHI	24	F	36143	FIBROADENOMA RT BREAST	EXCISION	0.7	NO	-	-	2

43	CHINNAMALAR	15	F	43523	GIANT FIBROADENOMA LT BREAST	EXCISION	0.5	NO	-		3
44	SELVAM	43	F	45401	LUMP LEFT BREAST	EXCISION	0.6	NO	-	-	2
45	MADASAMY	54	M	61720	RIGHT HYDROCELE	EVERSION OF SAC	0.4	NO	-	-	4
46	AMEER	70	M	26751	RIGHT HYDROCELE	EVERSION OF SAC	0.5	YES	SUPFL. INCISIONAL	STAPH AUREUS	9
47	RADHAKRISHNAN	65	M	15683	LEFT HYDROCELE	EVERSION OF SAC	0.6	NO	-	-	3
48	LAKSHMANAN	35	M	63848	LEFT HYDROCELE	EVERSION OF SAC	0.7	NO	-	-	4
49	RAMAR	52	M	71158	LEFT HYDROCELE	EVERSION OF SAC	0.6	NO	-	-	3
50	SOKKALINGAM	55	M	11496	RIGHT EPIDIDYMAL CYST	EXCISION	0.5	NO	-	-	3

Ref. No. 01104 /E4/3/2012

Govt.Rajaji Hospital,Madurai.20.
Dated: 13.03.2012

Institutional Review Board / Independent Ethics Committee.
Dr. A. Edwin Joe, M.D (FM), BL.,
Dean, Madurai Medical College & 2521021 (Secy)
Govt Rajaji Hospital, Madurai 625020.
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Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
Ethics committee-Meeting Agenda-communicated-regarding.

The next Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held at 11.00 Am to 1.00Pm on 23.02.2012 at the Dean Chamber, Govt. Rajaji Hospital, Madurai. The following members of the committee have been attended the meeting.

1. Dr.N.Vijayasankaran,M.ch(Uro.) 094-430-58793 0452-2584397	Sr.Consultant Urologist Madurai Kidney Centre, Sivagangai Road,Madurai	Chairman
2. Dr.P.K. Muthu Kumarasamy, M.D., 9843050911	Professor & H.O.D of Medical, Oncology(Retired)	Member Secretary
3. Dr.T.Meena,MD 094-437-74875	Professor of Physiology, Madurai Medical College	Member
4. Dr. S. Thamilarasi, M.D (Pharmacol)	Professor of pharmacology	
5.Dr.Moses K.Daniel MD(Gen.Medicine) 098-421-56066	Professor of Medicine Madurai Medical College	Member
6.Dr.M.Gobinath,MS(Gen.Surgery) 097-871-50040	Professor of Surgery Madurai Medical College	Member
7.Dr.S. Dilshadh, MD(O&G)	Professor of OP&Gyn Madurai Medical College	Member
8.Dr.S.Vadivel Murugan., M.D, 097-871-50040	Professor of Medicine Madurai Medical College	Member
9.Shri.M.Sridher,B.sc.B.L. 099-949-07400	Advocate, 623-B.II.Floor,East II Cross, K.K.Nagar,Madurai.20.	Member
10.Shri.O.B.D.Bharat,B.sc., 094-437-14162	Businessman Plot No.588, K.K.Nagar,Madurai.20.	Member
11.Shri. S.sivakumar,M.A(Social) Mphil 093-444-84990	Sociologist, Plot No.51 F.F, K.K Nagar, Madurai.	Member

Following Projects were approved by the committee

Sl. No	Name of P.G.	Course	Name of the Project	Remarks
1.	Sulthana Dhilras. J	PG, M.S (genl surg)	Antibiotic prophylaxis in prevention of SSI.	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution to Government.
2. She/He should inform the institution Ethical Committee in case of any change of study procedure site and investigation or guide.
3. She/He should not deviate for the area of the work for which applied for Ethical clearance.
She/He should inform the IEC immediately, in case of any adverse events pr Serious adverse reactions.
4. She/he should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and apply for if any Extension of time is required She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the word or on completion.
8.She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

DEAN

13/3/12

To
All the above members and Head of the Departments concerned.
All the Applicants.